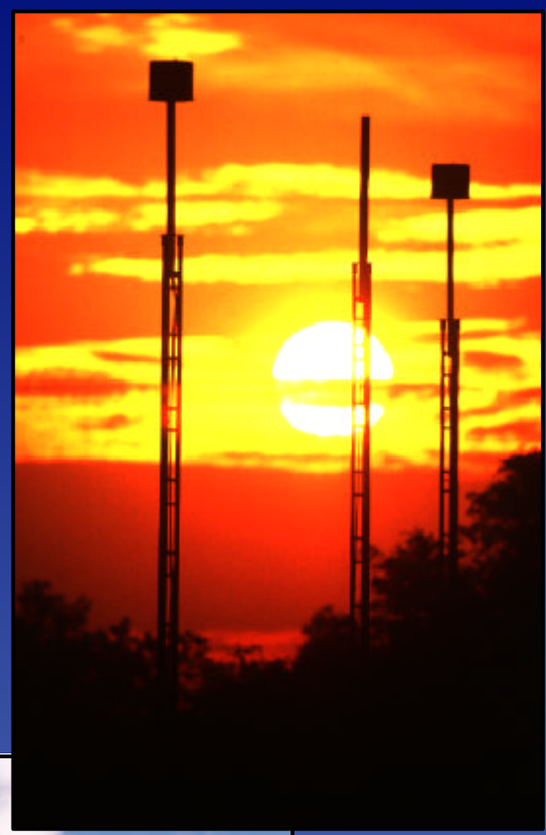
U.S. Environmental Protection Agency (EPA)

Clean Air Status and Trends Network (CASTNet)



Quality Assurance Project Plan

Appendix 6

Harding ESE Health and Safety Plan Government Property Control SOP

November 2001

Prepared by:

Harding ESE

A MACTEC COMPANY

Harding ESE, Inc.

Health and Safety Plan (HASP) Approval

PROJECT: Clean Air Status and Trends Network (CASTNet)

Work Assignment	Harding ESE Project Number
Base Program and Options A & B	311500
Mountain Acid Deposition Program (Clingman's Dome)	311504

We have reviewed the attached HASP for the above referenced project. We recognize that when this form is completed, the attached HASP is approved for field activities on the above referenced project. Changes to this HASP shall be documented in writing.

Thomas F. Lavery — 10/15/01

Thomas F. Lavery, Harding ESE Project Manager — Date

H. Kemp Howell — 10/16/01

H. Kemp Howell, Harding ESE Work Assignment Manager, Base Program and Options A & B — Date

Christina M. Costakis — 11/19/01

Christina M. Costakis, Harding ESE Work Assignment Manager, Mountain Acid Deposition Program — Date

Hugh L. Thomas — 10/30/01

Hugh L. Thomas, Harding ESE Health and Safety Officer — Date

Cynthia Sundquist — 10/8/01

Cynthia Sundquist, Harding ESE Health and Safety Manager — Date

CASTNet SITE HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT

I acknowledge that I understand the requirements of the CASTNet Site Health and Safety Plan (Revised May 2001) and agree to abide by the procedures and limitations specified. I also acknowledge that I have been given an opportunity to have my questions concerning the CASTNet Site Health and Safety Plan and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

SIGNATURE	EMPLOYEE NUMBER	DATE

SUBCONTRACTORS

I have provided subcontractors who will be performing field activities on this site with a copy of this Site Health and Safety Plan. I have also informed the subcontractors that OSHA Standards 29 CFR 1910.1200, 29 CFR 1910.147 and 29 CFR 1910.66 (included as Appendices) applies to their field activities.

_____

Project Manager Date

GENERAL SAFETY RULES FOR CASTNet SITES

To maintain personal safety and ensure that the emergency response procedures can be effectively implemented, the following general safety rules and practices will be used at all CASTNet monitoring sites:

1. Common sense should prevail at all times. Each individual is responsible for safely carrying out assigned tasks so as to not endanger themselves or others around them.
2. No horseplay, drugs, alcohol, or firearms are permitted onsite and will result in immediate disciplinary procedures that may include termination of employment if observed.
3. Site work and driving will normally be accomplished between 7 a.m. to 10 p.m. to allow the greatest possibility of obtaining help in an emergency. Work outside of these hours is discouraged but may occasionally be conducted at the discretion of the individual employee in consultation with the CASTNet Field Operations Manager (FOM). Field equipment Specialists are also responsible for maintaining routine communication with the CASTNet FOM.
4. No eating or drinking will be permitted within the monitoring site while handling any sampling media or while working on electrical equipment.
5. No smoking within the shelter or within 50 feet of any site equipment. Any individual smoking in the vicinity of the site shall observe appropriate local precautions against grass fires and forest fires.
6. Safety belts shall be worn in all vehicles. The belts should be completely secured before the vehicle is put into gear and moved for any distance.
7. Injuries will be reported immediately to the employees' direct supervisor, the Health and Safety Representative, and the Work Assignment Manager.
8. Work directed by Harding ESE shall be performed by a Harding ESE employee, Harding ESE consultant, or Harding ESE subcontractor. Visitors to the site shall be directed to a safe distance from the work being performed by Harding ESE, its consultants, or its subcontractors.
9. Emergency routes, telephone numbers of local authorities, and location of the nearest medical facility must be posted in a conspicuous location onsite.

All accidents must be reported to the Health and Safety Officer immediately. The Health and Safety Officer will then report all accident information to the Project Manager and the Harding ESE Health and Safety Manager. Prompt reporting is essential for the prevention of future incidents in addition to the well being of the affected individual or individuals.

Table of Contents

1.0 INTRODUCTION AND OVERVIEW

This HASP addresses the health and safety concerns and potential hazards associated with work tasks at the CASTNet sites. The HASP was specifically developed for the protection of individuals of the Harding ESE field crew while working at these sites. This HASP and the Harding ESE Corporate Health & Safety Program Manual constitute Harding ESE's site health and safety program.

1.1 PROJECT INFORMATION

PROJECT NAME: CASTNet

Work Assignment	Harding ESE Project Number
Base Program and Options A & B	311500
Mountain Acid Deposition Program (Clingmans Dome)	311504

LOCATION: Currently, over 50 sites located throughout the United States and Canada.

1.2 PROJECT STAFFING

Project Manager	Thomas F. Lavery	904-242-8852
Work Assignment Manager, Base Program Options A&B	H. Kemp Howell	352-333-6612
Work Assignment Manager, Mountain Acid Deposition Program	Christina M. Costakis	352-333-1636
Field Operations Manager	Eric O. Hebert	352-333-6611
Health and Safety Officer	Hugh L. Thomas	352-333-2628
Field Equipment Specialists	C. Keith Halbrook	352-333-6636
	Michael A. Estevez	352-332-3318 x6004

1.3 SUBCONTRACTORS

Individual Site Operators
Air Resource Specialists
GAVCO
Air Quality Services
Meteoros Consulting

1.4 SITE DESCRIPTION AND HISTORY

The CASTNet project currently consists of about 50 meteorological and air quality monitoring sites located throughout the continental United States and Canada. These sites involve monitoring air filter concentrations (dry deposition), meteorological parameters, visibility, and other parameters. The project uses site operators (usually private individuals) who change media and inspect equipment weekly and Field Equipment Specialists (Harding ESE employees) who calibrate and repair the sites biannually.

1.5 SITE TASK ASSIGNMENTS

Project tasks are primarily performed by Field Equipment Specialists and the FOM with occasional participation by the Project Manager and the Work Assignment Manager.

Work assignment tasks are described as follows:

Task	Description
Audit Monitoring Systems	Each meteorological and ambient measurement system is challenged with a known standard. The system response is recorded and compared with allowable tolerances.
Calibrate and Repair Monitoring Systems	Systems with out-of-tolerance response are adjusted and, in some cases, repaired or replaced.
Install Monitoring Systems	As program needs arise, new systems are installed in the field and subjected to an initial calibration. Installations range from adding a new plug-in component to setting up new shelters, power and phone service, and buried signal lines.
All Tasks	Measurements include: wind direction, wind speed, temperature, rainfall, wetness, relative humidity, solar radiation, ozone, and filter flow rate.

2.0 PERSONAL PROTECTIVE EQUIPMENT

2.1 SAFETY GLASSES

Safety glasses shall be worn while soldering, while using any power tools or striking tools (e.g., hammering), and during any other activity that may cause particles, liquids, or gases to be ejected from the work surface. Harding ESE will provide prescription safety glasses (up to one set per 18-month period) to any field team member (as required). Replacement of prescription safety glasses shall be the responsibility of the individual employee.

2.2 HARD HATS AND GLASSES

Hard hats and glasses shall be worn in the vicinity of any tower when any other personnel are climbing or working above head level. Hard hats and glasses will be kept at each site.

2.3 SAFETY SHOES

Safety shoes shall be worn during any activities that may present a foot injury hazard (e.g., mowing, heavy equipment operation, or shelter placement). It is the responsibility of the individual to have safety shoes available during each field effort.

2.4 LIFELINES AND HARNESSES

Lifelines and harnesses or belts shall be worn as set forth in Section 3.5.

3.0 SAFETY OPERATING PROCEDURES

1. GENERAL

2. Common sense should prevail at all times. Each individual is responsible for safely carrying out assigned tasks so as to not endanger themselves or others around them. Field equipment specialists are also responsible for maintaining routine communication with the CASTNet FOM.
3. Site work and driving will normally be accomplished between 7 a.m. to 10 p.m. to allow the greatest possibility of obtaining help in an emergency. Work outside of these hours is discouraged but may occasionally be conducted at the discretion of the individual employee in consultation with the FOM.
4. No eating or drinking will be permitted within the monitoring site while handling any sampling media or working on electrical equipment.
5. No smoking within the shelter or within 50 feet (ft) of any site equipment. Any individual smoking in the vicinity of the site shall observe appropriate local precautions against grass fires and forest fires.
6. Safety belts shall be worn in all vehicles. The belts should be completely secured before the vehicle is put into gear and moved for any distance.
7. Injuries will be reported immediately to the employee's direct supervisor, the Health and Safety Representative and the Work Assignment Manager.
8. Work directed by Harding ESE shall be performed by a Harding ESE employee, Harding ESE consultant, or Harding ESE subcontractor. Visitors to the site shall be directed to a safe distance from the work being performed by Harding ESE, its consultants, or its subcontractors.

3.1 EQUIPMENT AND SUPPLIES

1. Only safety equipment that meets or exceeds ANSI standards shall be used.
2. A 16-unit first aid kit and a 1-A 10-BC rated fire extinguisher will be installed at each site shelter. Field personnel will routinely and regularly check the stock conditions of the first aid kit and the charge condition of the fire extinguisher. Any deficiencies will be reported to the FOM.
3. Emergency routes, telephone numbers of local authorities, and the location of the nearest medical facility shall be posted in a conspicuous location onsite.

3.2 WEATHER HAZARDS

1. No outdoor activity will take place during lightning, hail storms, heavy rain, blizzard conditions, or any other weather conditions that, in the opinion of the individual employee, represent an unreasonable hazard. Before arriving at each site, local conditions should be assessed to avoid danger from avalanche, wildfire, or other natural hazards.
2. Tower activity should be restricted to the daylight hours unless adequate lighting is provided for those working on the tower.

3.3 ELECTRICAL HAZARDS

1. No eating or drinking will be permitted in the vicinity of any piece of electrical equipment which has its cover removed.
2. Jewelry such as, rings, watches, bracelets, and necklaces shall not be worn while working inside electrical equipment.

3. Power supplies or other high voltage devices shall not be repaired in the field but replaced with the power source disconnected or the power shut off at the breaker in the electrical panel. Lock out/Tag out procedures (See Appendix C 29 CFR 1910.147) will be utilized to ensure that the power supply remains secure against accidental activation when more than one person is present at the site.
4. When there is a chance that activation of an electrical circuit can produce physical harm or death, then the device shall be tagged identifying such information.

3.4 TOWER SAFETY

1. No tower shall be climbed, or in the case of towers not equipped with mechanical aids designed for operation by one person (e.g., winches or tilt mechanisms), no tower shall be lowered or raised unless a second Harding ESE employee, subcontractor, contracted site operator consultant, or employee of the client capable of acting as a safety backup is onsite and within sight and hearing distance.
2. Individuals working above the ground shall secure themselves to the tower with a lifeline and safety harness or belt. This equipment will be provided by Harding ESE and inspected prior to use in the field. See Appendix D 29CFR 1910.66AppC for inspection and maintenance guidelines.
3. The tower shall not be climbed in high winds, if ice has accumulated on the tower, or if an electrical storm is imminent.

3.5 OTHER RULES

Safety regulations specified by any client or for any facility at which work is performed will be observed. The Project Manager will determine these requirements and take steps to ensure compliance.

4.0 PROJECT AND SITE SPECIFIC TRAINING

Harding ESE Field Equipment Specialists who have not completed the following training requirements, will not be given any field assignments:

- Hazardous Communications Class as set forth in 29 Code of Federal Regulations (CFR) 1910.120,
- First Aid and CPR Training, and
- National Safety Council Defensive Driving Course.
- Lockout/Tagout as set forth in 29 CFR 1910.147.

All field personnel will repeat CPR training annually and First Aid training every 3 years. Harding ESE employees will not be given a field assignment if more than 1 month has passed since certification has lapsed for the courses.

It is the responsibility of the Work Assignment Manager to ensure the availability of the required courses and to coordinate employee availability with individual supervisors.

5.0 PROJECT AND SITE SPECIFIC MEDICAL REQUIREMENTS

Harding ESE standard medical monitoring does not apply to this project.

6.0 EMERGENCY PROCEDURES

6.1 MEDICAL EMERGENCY

Initiate first aid and seek professional medical attention for the injured person immediately. Take the injured person to a hospital emergency room or call an ambulance, as necessary.

As soon as possible, notify the injured employee's direct supervisor and the FOM.

The injured employee's supervisor, with the aid of the local Health and Safety Manager (LHSM), should prepare and submit an Accident Report Form within 24 hours. The LHSM will notify the Workers Compensation Insurance Company immediately if the accident will involve medical costs or lost time. The Harding ESE Accident Report Form is presented in Appendix A.

Send a copy of the Accident Report to the Regional Health and Safety Manager, Corporate Health and Safety Manager, Corporate Claims Officer, and Human Resources.

6.2 HOSPITAL ROUTE DIRECTIONS AND MAP

Directions to local hospitals and clinics are posted inside each site shelter and are part of the site information notebooks carried by all field staff. Hospital directions and emergency information (i.e., phone numbers) on each site is contained in Appendix B.

6.3 EMERGENCY INFORMATION

Local emergency contacts and telephone numbers are posted inside each site shelter and are part of the site information notebooks carried by all field staff.

Appendix A

Accident Report Form

HARDING ESE REPORT OF OCCUPATIONAL ACCIDENT, INJURY, OR ILLNESS

Office & Department	Department No.	Date of Report

INITIAL REPORT

Last Name	First Name	Middle Initial	Home Address (Street, City, State, Zip Code)

Sex	Employee No.	Social Security No.	Birth Date (Month, Day, Year)	Occupation (Job Title)

Date of Accident (Month, Day, Year)	Time Of Accident	Exact Location of Accident	Did Accident Occur on ESE Property?
	☐ A.M. _____ ☐ P.M.		☐ Yes ☐ No

Employee's Home Office & Dept. No.	Supervisor's Name	Project Manager's Name

Project No.	Result of Accident (Check All That Apply) ☐ Near Miss ☐ Injury ☐ Illness

What was employee doing at time of accident? *(Be specific. Include information on tools, equipment, materials in use and what employee was doing with them.)**

How did the accident occur? *

INJURY/ILLNESS INFORMATION

Type of Injury or Illness	Part(s) of Body Affected *(Be Specific!)*

Date of Treatment	Was Employee Admitted to Hospital? ☐ Yes** ☐ No	Did Employee Die? ☐ Yes** ☐ No

Name and Adress of Treating Physician (if known) or Hospital	Object or Substance Responsible for Injury/Illness	Date of Injury or Initial Diagnosis of Illness

Treatment Received *(Be Specific! Include any prescription medications)*

Reported By	Title	Phone No.

ANALYSIS RESULTS

Detailed description of the accident. State clearly how it happened. Attach separate sheet and photographs/diagrams as appropriate.

Who Was in Charge of Work?	Was He/She Present? ☐ Yes ☐ No	What Instructions Were Given?

Witnesses*	Years Employee Has with ESE	Years on Present Job	Amount of Experience with Task Being Performed

Proper Protective Tools & Equipment in Use? ☐ Yes ☐ No	If Not, Why Not?*

What Hazardous Condition(s) Contributed to the Accident? Explain Each.* (One or More of the Suggestions Below Must be Entered in this Space! There Must be a Hazardous Condition and/or Unsafe Act for There to be an Accident.)

What Unsafe Act(s) Caused/Contributed to the Accident? Explain Each.* (One or More of the Suggestions Below Must be Entered in this Space! There Must be a Hazardous Condition and/or Unsafe Act for There to be an Accident.)

Involved Employee's Recommendation(s) to Prevent a Similar Occurrence.*

What Action(s) Will be Taken to Prevent a Similar Occurrence? Be Specific.*

Discussed with Employee By (Name & Signature)	Date Discussed	Involved Employee's Immediate Supervisor (Signature)
		Office/Lab/Division Manager (Signature)

Employee Comments*

Employee Signature	Date

HAZARDOUS CONDITIONS

Congested area/insufficient workspace	Slick surface	Improper use of hands or body parts
Defective apparel	Special task assignment	Inattention
Defective Equipment	No hazardous condition	Inexperience
Environmental factor		Lack of communication
Improper design	UNSAFE ACTS	Lack of knowledge/skills
Improper equipment	Disregard of instructions	Lack of proper equipment/tools
Improper illumination	Disregard of safety rules	Overestimation of personal cabability
Improper ventilation	Due to vehicular accident	Poor judgement
Improper apparel	Horseplay	Unsafe loading, pulling, or mixing
Improperly guarded	Failure to use/improper use of protective equipment	Unsafe rigging
Lack of proper tools/equipment	Improper positioning of self	Unsafe speed
Obscured vision	Improper lifting method	Using defective equipment
Inclement weather	Improper operating method	Working on moving equipment
Poor housekeeping	Improper use of tools/equipment	No unsafe Act

*Attach Additional Sheets as Necessary

Please Print Clearly or Type

**Notify Corporate Health & Safety of Death or Hospitalization Immediately

Appendix B

Site Emergency Information

CASTNet Site Contact List

Site Number: 106 (PSU106) Site Name: **Penn State, PA** Updated: **10/29/01**

Shelter Telephone: **(814) 237-5778**

Directions to Site: NOTE: ARRANGE FOR KEY From Harrisburg, PA take Hwy 322 to State College. Take Hwy 26 south (downtown) to Hwy 45; 26 meets w/45. Continue to Rock Springs on Hwy 45 west. About 2 miles out of town a green hwy info and brown historical sign will appear just after a white house. This is Tadpole Road. Take a right onto Tadpole Road. Site will be visible in field on left. Look for trail about 1/4 mile on left; it will take you to the site.

Hazards: N/A

Emergency Contact: Centre Community Hospital; (814) 231-7000

Emergency Phone: 911

Emergency Directions to Medical Facility: From Site take Route 45 toward State College; turn left onto Route 26, turn left again onto route 322 then right onto Park Ave. Follow the hospital signs.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Somerset Rural Electric

Utility Phone: (814) 445-4106

Telephone Company: Bell of PA

TelCo Phone: (717) 327-7954

Comments:

CASTNet Site Contact List

Site Number: **107** **(PAR107)** Site Name: **Parsons, WV** Updated: **10/29/01**

Shelter Telephone: **(304) 478-8647**

Directions to Site: Take Highway 33W to Elkins. Pick up 19 N to Parsons. Continue through town to the Nursery Bottom Reservoir. The site entrance is on the right next to the visitor's center.

Hazards: N/A

Emergency Contact: Tucker County Ambulatory Center; (304) 478-2511

Emergency Phone: 911

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

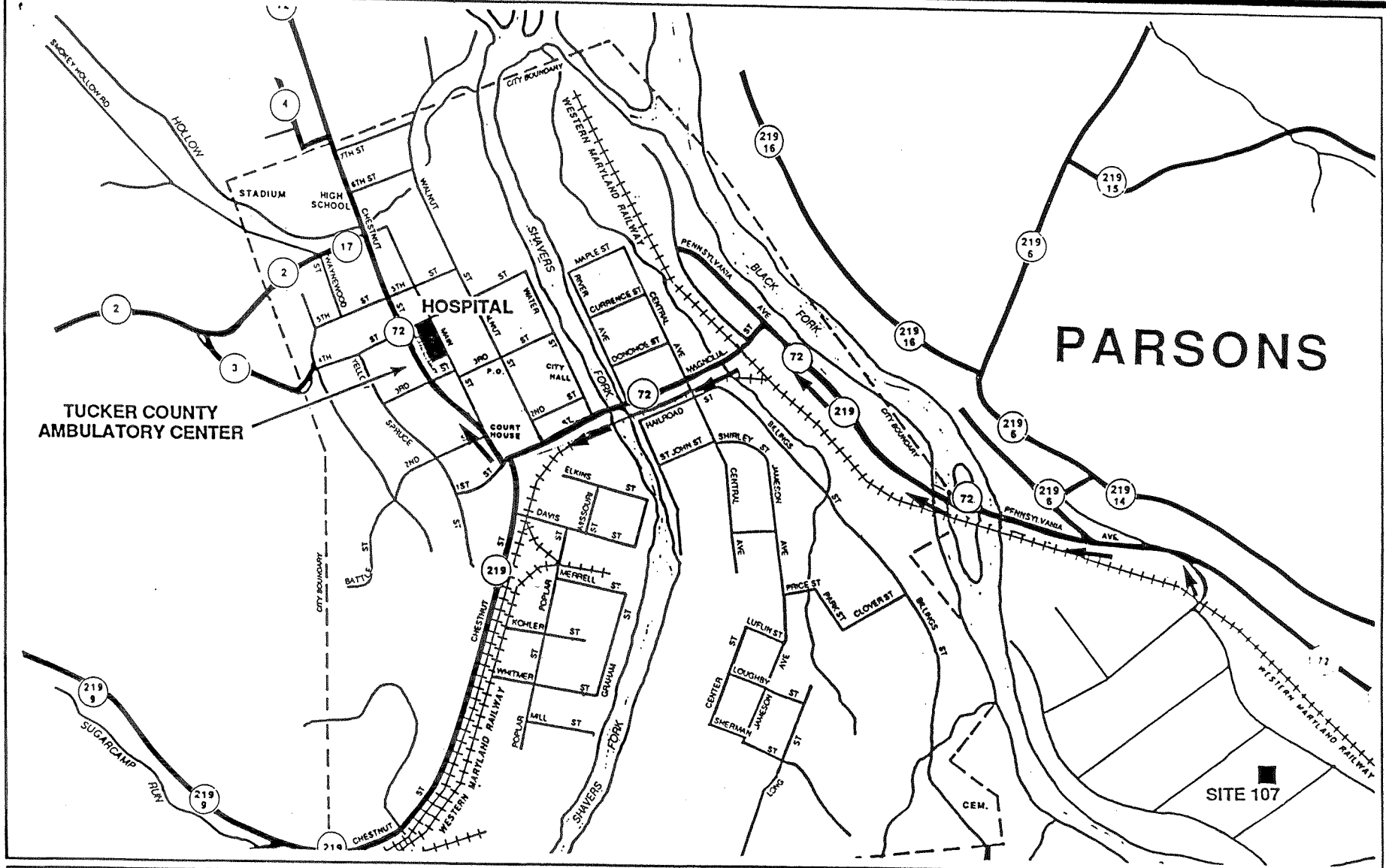
Electric Utility: Monongahela Power Co

Utility Phone: (304) 478-2031

Telephone Company: Citizens Communications

TelCo Phone: (800) 921-8105

Comments:



NEAREST MEDICAL FACILITY TO SITE 107

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	108 (PED108)	Site Name: Prince Edward, VA		Updated: 9/18/01

Shelter Telephone: (804) 392-9506

Directions to Site: From Petersburg, VA take 460 West. About 1 mile from Farmville turn left South on 696. There will be a brown sign for Twin Lakes State Park at the turnoff. After traveling 5 miles there will be another sign for the state park. At the "Y" (Hwy612) go straight (going left will take you to the park). After approximately 8.4 miles you will come to the sign for Prince Edward Gallion State Forest. Approximately 8.6 miles from Hwy 460 you will come to Hwy 629; turn left. Go approx 1.3 miles (top of hill) and you will come to a dirt/gravel road on the right. Take a right onto that road. The road splits, go right again. There will be a wooden barricade; go around to the left of it and proceed to site. Site is not visible from the main road.

Hazards: recreational hunting

Emergency Contact: Burkeville Medical (804)767-5511

Emergency Phone: 911

Emergency Directions to Medical Facility: Upon leaving site, take a right onto Rt. 629, when you reach Rt. 613 take a right, go to Rt. 360, take a right (go east) to Burkeville Medical Bldg. (approx 7 miles).

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: X23261

Electric Utility: Southside Electric Coop 930-027-001-01

Utility Phone: (800) 552-2118

Telephone Company: Sprint

TelCo Phone: (800) 329-1414

Comments:

CASTNet Site Contact List

Site Number:	109 (WST109)	Site Name: **Woodstock, NH**		Updated: **10/29/2001**

Shelter Telephone: **(603) 726-4935**

Directions to Site: From junction of SR 112 & US 3 in Woodstock, proceed South on US 3 for 7.3 miles. Turn right on Mirror Lake Road. Follow road 1.2 miles to end of road, site is on right across from Hubbard Brook Experimental Station Office. Or, from I-93 take Thornton Exit (#30). Go 2.0 miles south, turn right on Mirror Lake Road, site is 1.2 miles on the right.

Hazards: recreational hunting, mountainous area, lake nearby, moose

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Take Mirror Lake Road 1.8 miles to Route 3, take a right, go 3 miles to Route 93, take another right, go 10 miles, take exit 25 (Tonny Mtn. Hwy), get back on Rt. 3, go 2 miles to Downtown Plymouth, go past PSC College on Hospital Road. Speare Memorial Hospital is about 0.5 miles further west.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: N.H. Electric Coop., Inc.

Utility Phone: (800) 698-2007

Telephone Company: NYNEX/Bell Atlantic

TelCo Phone: (800) 342-9063

Comments: Telephone repairs: (603) 555-1515. Utility customer service accepts calls only from 7am-6pm. Call (800) 343-6432 to report power outages. Police: (603) 726-4222; Fire Department & Ambulance (603) 524-1545; Medical Facility: (603) 536-1120.

CASTNet Site Contact List

Site Number:	**110**	**(CTH110)**	Site Name: **Connecticut Hill, NY**	Updated: **10/29/01**

Shelter Telephone: **(607) 564-7622**

Directions to Site: From Ithaca, NY take Route 13 South (locally called Elmira Road). Outside of town, Hwy 327 will veer off to the right. Take 327. There is a sign for Robert Tremon State Park at this intersection. Follow 327 past both the lower and upper park entrances. Take the 2nd left past the upper park entrance, which is Trumbell Corners Road. Follow this road approximately one mile until you come to a "T". Go right at the "T" on Connecticut Hill Road. Follow that road for approximately 1/4 mi and it will make a 90 degree turn to the right. The site drive is the next drive on the left. The site is located back and up the hill, so you have to look over your shoulder to see it from the road. If you come to a pond with a red house next to it, you have gone too far.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site, take Trumball Road to Rt. 327, take a right on 327, it will turn into Halseyville Road, take Halseyville Rd to Hoyt Rd, go right on Hoyt road to Tompkins Community Hospital.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: NYSEG

Utility Phone: (800) 572-1111

Telephone Company: NYNEX/Bell Atlantic

TelCo Phone: (800) 890-6464

Comments: Police (607) 272-3245; State Police (607) 273-4671; County Sheriff (607) 272-2444; Fire Department (607) 273-8000; Ambulance (607) 273-8000; Nearest Medical Facility, Tompkins Community Hospital (607) 274-4011.

CASTNet Site Contact List

Site Number:	111 (SPD111)	Site Name: **Speedwell, TN**	Updated: **9/17/01**

Shelter Telephone: **(423) 869-8159**

Directions to Site: Leave Knoxville on I-75 North. Get off the interstate onto US-25W at Caryville, exit 134, then on state road 63 (heading northeast) at La Follette. After about 15 miles highway 63 will cross the county line into Claiborne County and the mile markers will restart at zero. Just past the mile marker 6 in Clairborne County, turn right (southeast). As of August 95 there is a B&B Texaco on the other side of the highway at this point. Turning off the highway, drive about 200 yards and turn left at the "T". After 100 yards, turn right, it should be the first right, near an old filling station. This known as Russell Road and look for the shelter near a silo in a field to the right. Entrance is a barbed wire fence gate just past the silo. Bear left at 1st fork in "driveway."

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Take Russell Lane 1 mile to service station on right & Old Hwy. 63, take Hwy 63 to a brick house on right (approx 1/8 mile), take a right, go 1/8 mile, turn right onto Highway 63, go approx 20 miles to La Follette Medical Center.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: LaFollette Electric Co.

Utility Phone: (423) 562-3316

Telephone Company: BellSouth

TelCo Phone: 557-6000

Comments: Police (423) 626-2820; Fire Department (615) 869-8275 (day) 865-2358 (night); Ambulance (423) 562-2211; Nearest Medical Facility, LaFollette Medical Center (423) 562-2211. Utility also (800) 352-1340. Telephone also (800) 766-9115.

CASTNet Site Contact List

Site Number: **112** **(KEF112)** Site Name: **Kane Exp. Forest, PA** Updated: **9/17/01**

Shelter Telephone: **(814) 837-8069**

Directions to Site: From Pittsburg, PA take I-79 N to I-80 E to Dubois and 219 to 321 to Kane. Take 66 south out of Kane. Go 1 mi. then turn left (just past 2nd cemetery). Continue 0.7 mi to "T". Go right. Continue thru village of Lamont (approx 3.2 mi). 1/2 mile past Lamont there is a gravel road to the left with a sign marked Kane NE Forest Experimental Station. Follow road approx 2 mi., always bearing left. You will see the Exp. Station on left (green buildings), veer left, the site is in the field behind cabins on left.

Hazards: recreational hunting Sep-Jan

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

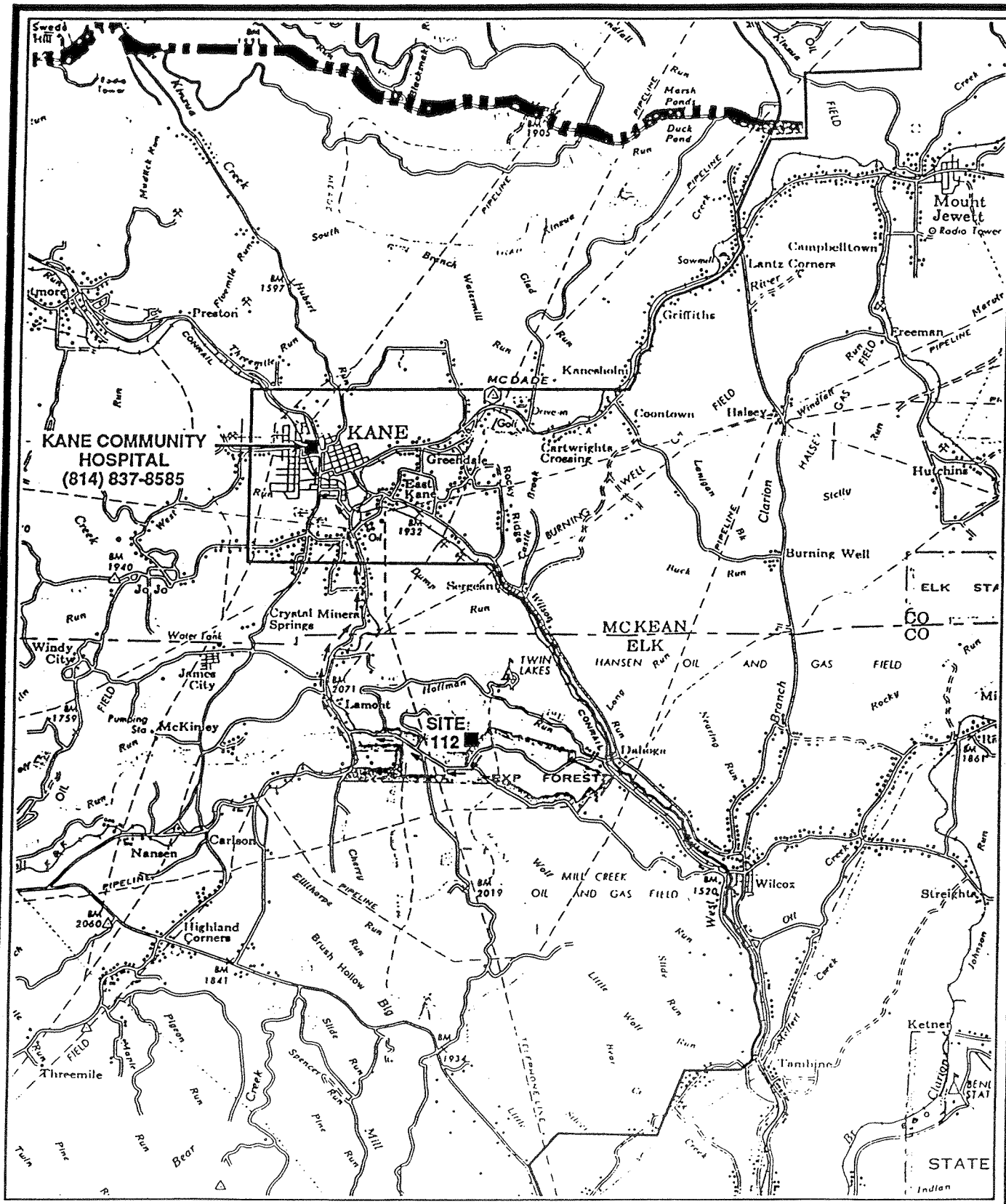
Electric Utility: Allegheny Power

Utility Phone: (800) 255-3443

Telephone Company: Bell Atlantic

TelCo Phone: (800) 479-1919

Comments: Police/Fire Department/Ambulance (814) 837-1000; State Police (814) 778-5555; Nearest Medical Facility, Kane Community Hospital (814) 837-8585.



NEAREST MEDICAL FACILITY TO SITE 112

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	113 (MKG113)	Site Name: **M.K. Goddard, PA**		Updated: **9/21/01**

Shelter Telephone: **(724) 253-3685**

Directions to Site: From Pittsburg, PA take I-79 to 358E to Sandy Lake. In town, go left on 173N. Go approx 2.5 mi until you see the 2nd sign for MK Goddard State Park. Turn left (country store on corner). Go approx 4 mi to the park office which is on the left (small sign). The site is located on the grass, behind the office; obtain permission to drive through loading dock area to site.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From park office, go 3 miles to R358, take right on 358, cross over Rt. 19 at traffic light, go 10 miles to Greenville, cross railroad tracks, take second right, then a left to Greenville Hospital.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Penn Power

Utility Phone: (800) 720-3600

Telephone Company: Alltel Telephone

TelCo Phone: (800) 255-8357

Comments: Police (724) 662-4200; Fire Department (724) 588-1311; Ambulance (724) 376-2525; Nearest Medical Facility Greenville Hospital (724) 588-2100.

CASTNet Site Contact List

Site Number:	**114** (DCP114)	Site Name: **Deer Creek, OH**	Updated: **10/29/01**

Shelter Telephone: **(740) 869-4722**

Directions to Site: Take South I-71 out of Columbus, OH. Go approx 22 mi. Take exit 84, the Mount Sterling exit, Hwy 56. Go east to Mount Sterling. Go right at 2nd light (Hwy 207). After 2/10 mi SR 207 bears left, continue on 207 (IGA on left) 3.8 miles to 1st crossroads (Yankeetown Pike), which has a Deer Creek Wildlife Area sign, and go left. Then take the 3rd right at park entrance. Go 1.1 mi and take a right (which is 1st right after golf course entrance, marked NR28). Go 0.5 mile and take left just before barricade. Site is 100 feet down road to left.

Hazards: natural gas sub-station 50 yards from site; rec hunting

Emergency Contact: Fayette Memorial Hospital; (740) 335-1210

Emergency Phone: 911

Emergency Directions to Medical Facility: From the site, go left on Yankeetown Pike, across State Road 207, go to State Road 62, turn left. Hospital is just inside town on the right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 491486

Electric Utility: Dayton Power and Light

Utility Phone: (614) 335-2160

Telephone Company: Sprint

TelCo Phone: (800) 407-5411

Comments:

CASTNet Site Contact List

Site Number: **115** **(ANA115)** Site Name: **Ann Arbor, MI** Updated: **10/29/01**

Shelter Telephone: **(734) 426-0060**

Directions to Site: From Ann Arbor, MI take 94 W to exit 169 (Zeeb Road). Go North (right) towards Scio. Go 2.3 miles. Make a left on Huron River Drive (flashing red light). Follow that road to the outskirts of Dexter. After 6 miles, the pavement ends (just past junction of North Territorial). Follow North Huron River (8.1 miles) until it becomes Strawberry Lake Road at a bend to the right. About 1/10 of a mile from the bend there is a red house on the left with a large, beige, metal barn behind it. Take the next drive on left which is marked "University of Michigan Research Area." Drive dead ends at site. If you come to the junction of Base Road you have gone too far.

Hazards: N/A

Emergency Contact: St. Joseph Mercy Hospital; (734) 878-4909

Emergency Phone: 911

Emergency Directions to Medical Facility: See Map

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 6X8809

Electric Utility: Detroit Edison

Utility Phone: (800) 477-4747

Telephone Company: Ameritech

TelCo Phone: (800) 480-8088

Comments: Detroit Edison account number A373wh08102aaa2.

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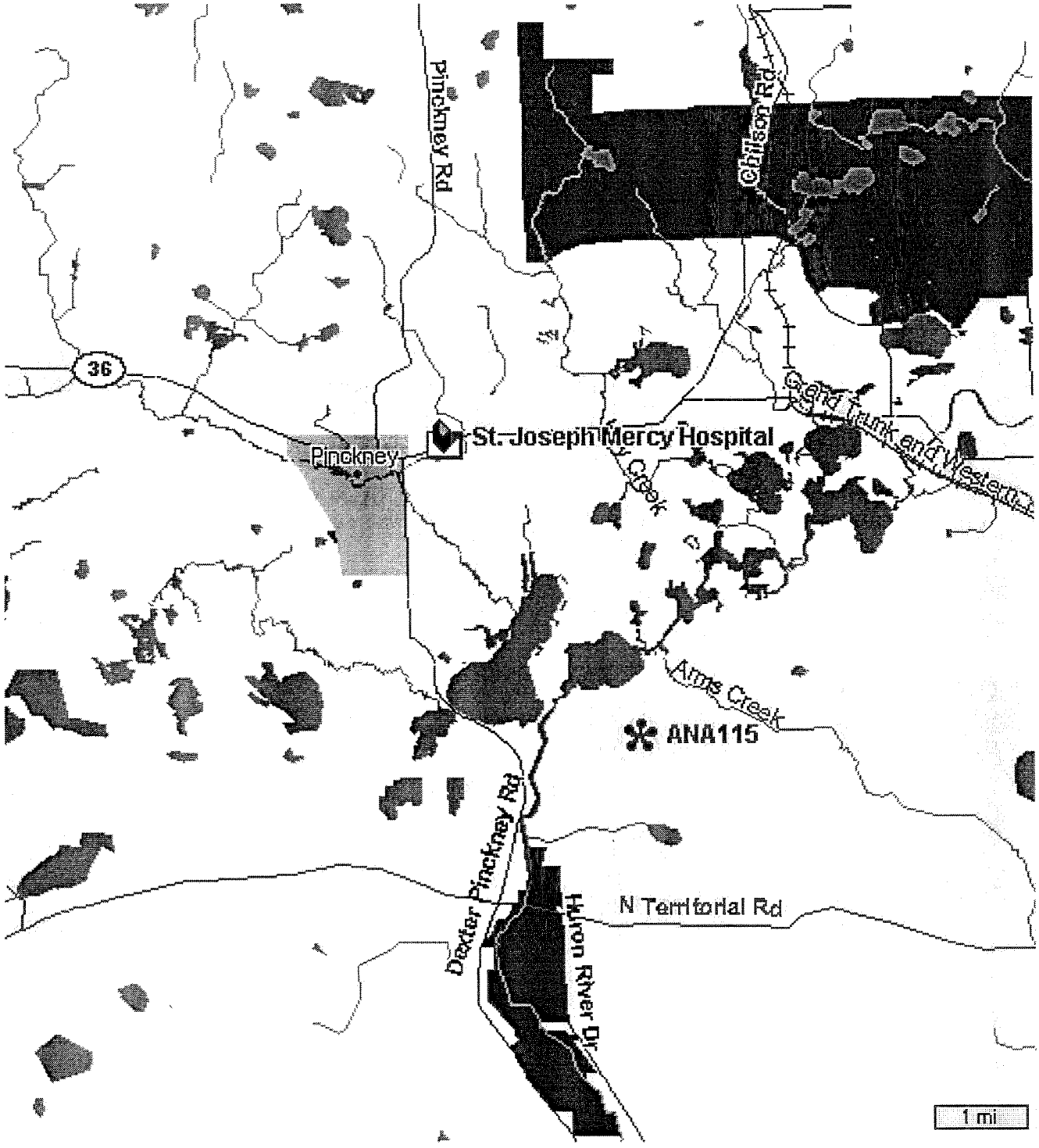


Nearest Medical Facility to Site 115

Source: Vacinity Corp, GOT, 2001; Mapblast.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number: **116** **(BEL116)** Site Name: **Beltsville, MD** Updated: **10/29/01**

Shelter Telephone: **(301) 474-5518**

Directions to Site: NOTE: ARRANGE FOR KEY from Washington, D.C. Take Baltimore/Washington Turnpike north to Powder Mill Road. Head east (toward the Museum). Pass entrance to NASA and take a right on Springfield Road. Approx. 0.7 miles you will come to a chainlink fence gate. Turn left through the gate and continue for about 3/4 of a mile and site will be visible on the right. The gate is usually open from 6 a.m. until 6:30 p.m.

Hazards: N/A

Emergency Contact: Doctors Community Hospital; (301) 552-8118

Emergency Phone: 911

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

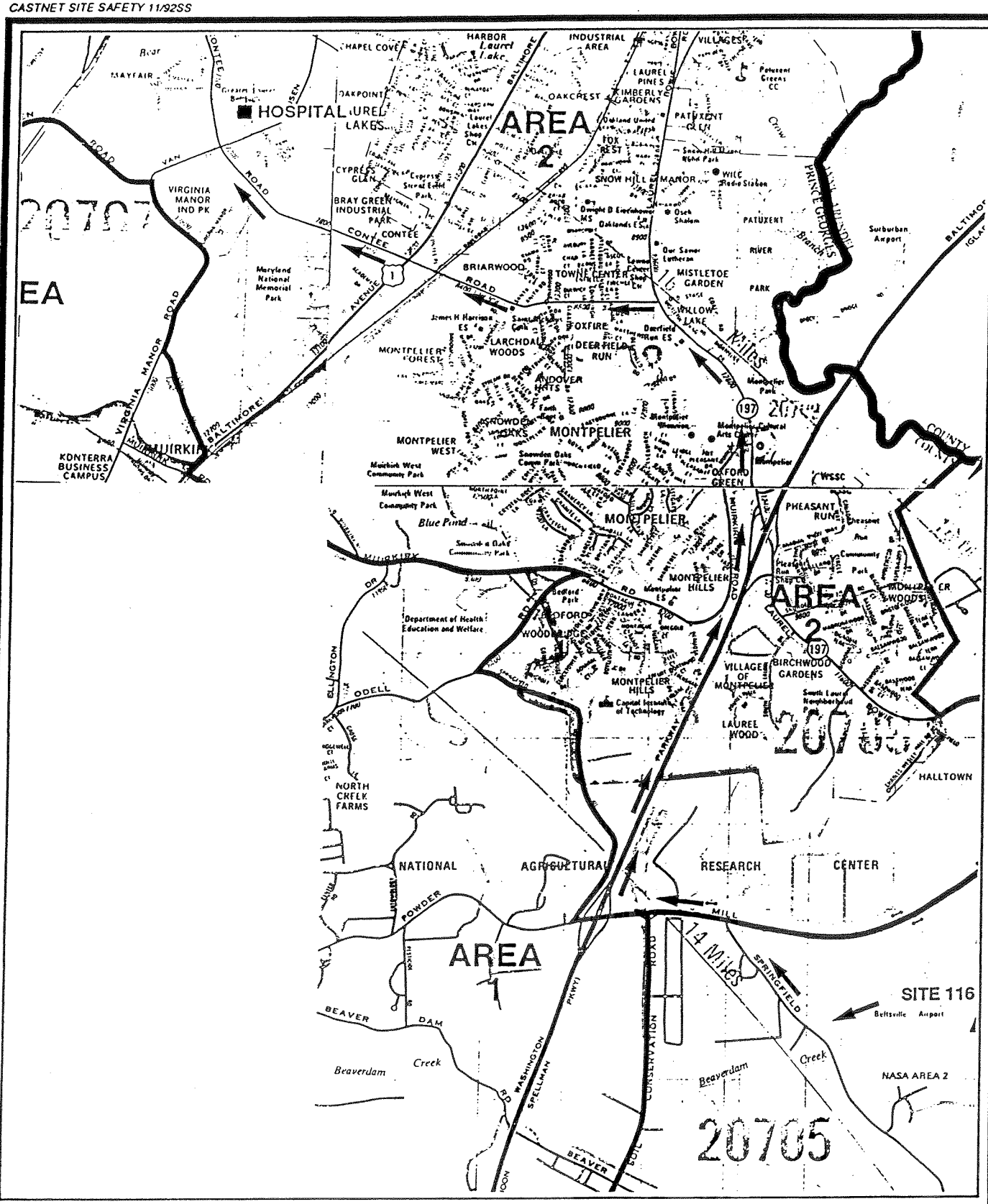
Electric Utility: BARC

Utility Phone: (301) 344-2434

Telephone Company: Bell Atlantic

TelCo Phone: (800) 440-8000

Comments:



NEAREST MEDICAL FACILITY TO SITE 116

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**117 (LRL117)**	Site Name: **Laurel Hill, PA**	Updated: **10/29/01**

Shelter Telephone: **(717) 352-8177**

Directions to Site: NOTE: ARRANGE TO GET KEY FROM SITE OPERATOR. From Pittsburg, PA take PA Turnpike (70/76) to Exit 9, take 31 east toward Laurel Hill State Park. Just past Bakersville, look for park sign for Laurel Hill on right. Follow that road 3.8 miles past the park entrance and you will arrive at a stop sign and a "T" in the road. Go right on CR 653. Follow that road approx 1.3 miles until you pass the South Entrance of the park. Take the 1st left after that. There is a small sign for picnic area #1. Go about 1/4 mile and turn right on Sewer Plant Road. It is a gated road with a special key. About 100' past gate, take the right fork. That road dead ends at the site.

Hazards: recreational hunting

Emergency Contact: Somerset Hospital;(814) 443-5000

Emergency Phone: 911

Emergency Directions to Medical Facility: From site exit park through park entrance. Take highway 31 to Somerset. Somerset Hospital is nearest medical facility. SEE MAP.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

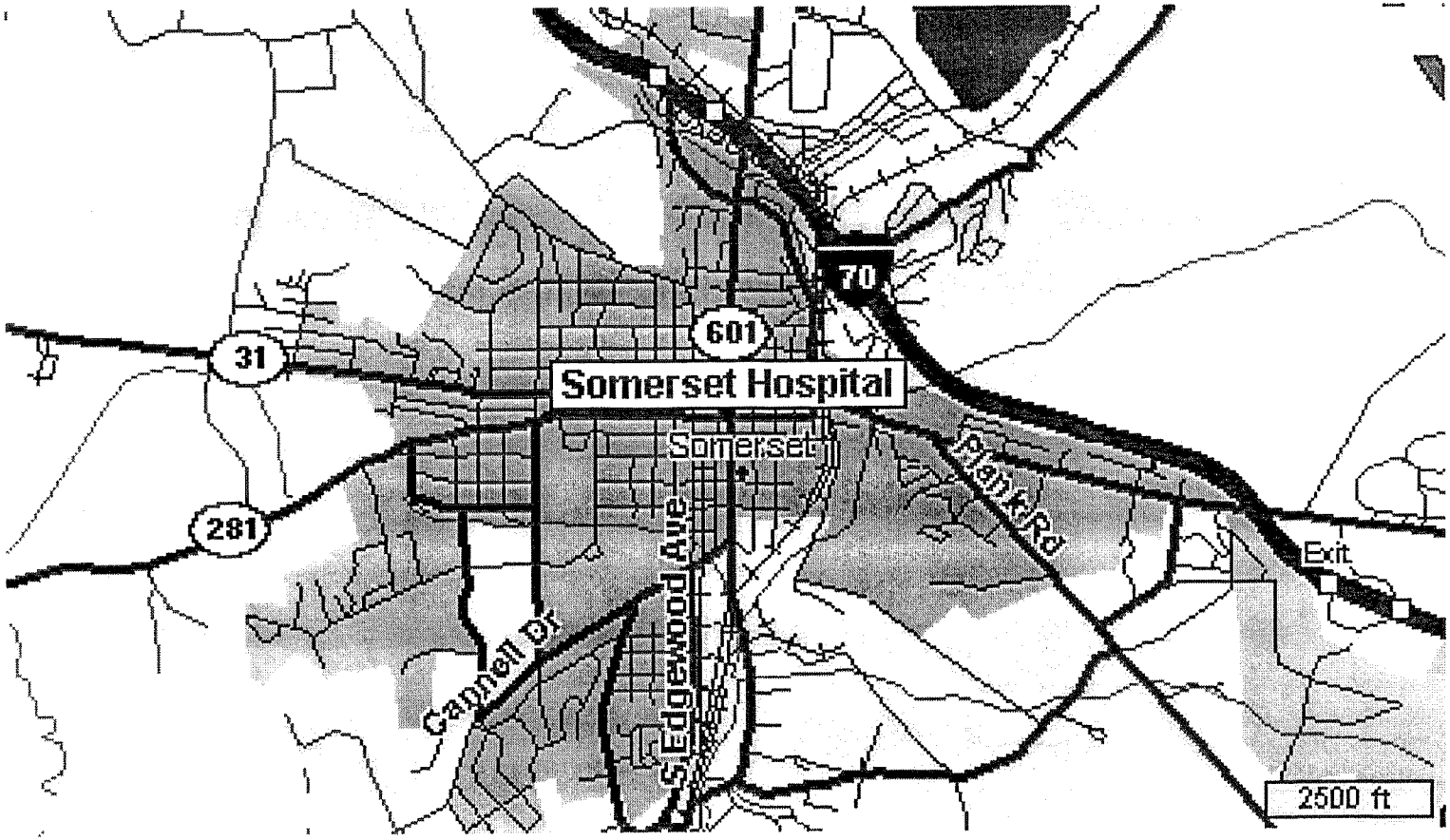
Electric Utility: Somerset Rural Electric Coop. Inc

Utility Phone: (814) 445-4106

Telephone Company: GTE Telephone

TelCo Phone: (800) 483-5600

Comments: Telephone number repair (800) 483-2000



Nearest Medical Facility to Site 117

Source: Vacinity Corp, GOT, 2001; Mapblast.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number: **119** **(CDR119)** Site Name: **Cedar Creek, WV** Updated: **10/29/01**

Shelter Telephone: **(304) 462-5375**

Directions to Site: From Charleston, WV take I79 North to Exit 79, Route 5. Go West on Route 5 to Glenville, WV. Take a left (South) on Hwy 33/119 at "T" intersection. Proceed through Glenville, straight through the light and 3.5 miles to Cedar Creek State Park Sign (on right). Turn left on #17, Cedar Creek Road. Proceed 4.4 miles to Park entrance. Do not enter park, go around to the left on main road. Site is 1/2 mile from the Park entrance, on right, and visible from road.

Hazards: if wet or snowing, 4x4 needed to get to site

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Take Cedar Creek Rd. to park entrance, take 33/119 Northeast to Glenville, go right on Mineral Road to Gilmer County Health Center.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 293960

Electric Utility: Monongahela Power Company

Utility Phone: (304) 364-5165

Telephone Company: Bell Atlantic

TelCo Phone: (800) 544-5663

Comments: Park Address: RT1, Box 9, Glenville, WV 26351; Police, Fire, Ambulance: (304) 462-7306; Gilmer County Health Center (304) 462-7351; Stonewall Jackson Memorial Hospital (304) 269-8073

CASTNet Site Contact List

Site Number: 120 (VPI120) Site Name: **Horton Station, VA** Updated: **9/17/01**

Shelter Telephone: **(540) 626-7003**

Directions to Site: From Blacksburg, VA take 460 West approx. 10 mi. Turn right on 700 north; there is a sign for Mountain Lake and Horton Station. Go six miles and the station is on the right, there is no sign, but there are 2 black mailboxes in a fieldstone stand, one of which is marked Horton. Proceed through the gate and the site will be visible.

Hazards: recreational hunting in Nov & Dec

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From Horton Center take Mountain Lake Road to 460. Take 460 East toward Christiansburg for Montgomery Co. Hospital. Take 460 West through Pembroke across the New River to Pearisburg Hospital. There is a First Aid Station in Newport, to get there take 460 East from Mt. Lake Road, turn right onto 42.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Appalachian Power Co.

Utility Phone: (703) 921-3777

Telephone Company: Pembroke Telephone

TelCo Phone: (540) 626-7111

Comments: Police: (702) 921-3842; Fire Department (702) 626-3800; Ambulance (702) 921-3842 or 544-7695; Nearest Medical Facility Pearisburg or Montgomery County Hospital (18 miles).

CASTNet Site Contact List

Site Number: **122** **(OXF122)** Site Name: **Oxford, OH** Updated: **10/29/01**

Shelter Telephone: **(513) 523-6912**

Directions to Site: (North of Cincinnati) Out of Oxford, Ohio go North on 732, which is locally named Main St. Outside of the town the road's name changes to Morning Sun. Continue past the athletic field and cross the river (approx 1 mi from the Days Inn) and turn right on Sommerville Road. Watch for the Ecological Research Center on the right at the top of the 2nd rise in the road (approx 1/4 mi); the sign sits back from the road and is difficult to see.

Hazards: N/A

Emergency Contact: McCoulough-Hyde Memorial Hospital; (513) 523-2111

Emergency Phone: 911

Emergency Directions to Medical Facility: Take Somerville Rd. to Rt. 732, turn left into Oxford, turn left on Withrow Street and right into the Emergency Drive. Total distance is approximately 1.5 miles.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Butler Rural Electric Coop, Inc.

Utility Phone: (800) 255-2732

Telephone Company: General Telephone

TelCo Phone: (800) 621-2712

Comments:

CASTNet Site Contact List

Site Number:	123 (LYK123)	Site Name: Lykens, OH	Updated: 9/21/01

Shelter Telephone: (419) 284-3326

Directions to Site: From junction of US 30 & SR 4 in Bucyrus, take Hwy 4 North 5.8 miles and turn left on Broken Sword Road. Then go 2.3 miles to Kennedy Street and turn right. Appox 1 mile on left is site.

Hazards: recreational hunting

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: At site driveway turn right, go to end of road and turn right, go to intersection and turn left, go into Bucyrus on St. Rt. 19 & 100. Continue straight where Rt. 19 & 100 turns after stop sign, continue to Hill Street, and turn left at Hill Street. Hospital is one block further on right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 5X1773

Electric Utility: North Central Electric Cooperative

Utility Phone: (800) 426-3072

Telephone Company: Sprint

TelCo Phone: (800) 407-5411

Comments: Additional utility phone (800) 426-3072. Telephone repairs (800) 407-4611; Police: (419) 562-7906 (Sheriff's Dept); Fire Department (419) 562-0806; Ambulance (419) 562-7010; Nearest Medical Facility: Bucyrus Community Hospital (419) 562-4677.

CASTNet Site Contact List

Site Number:	**124 (UVL124)**	Site Name: **Unionville, MI**	Updated: **9/17/01**

Shelter Telephone: **(517) 673-5901**

Directions to Site: Take 81 East from Saginaw, MI to Caro. From junction of SR 24 & 81, continue 2.9 miles East on 81. Turn left on Colwood (Church on left, Lucky's on right). Go 6 miles on Colwood to Dickerson Rd. (stop sign). Turn left, see site on right behind first farmhouse on right.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 7X1473

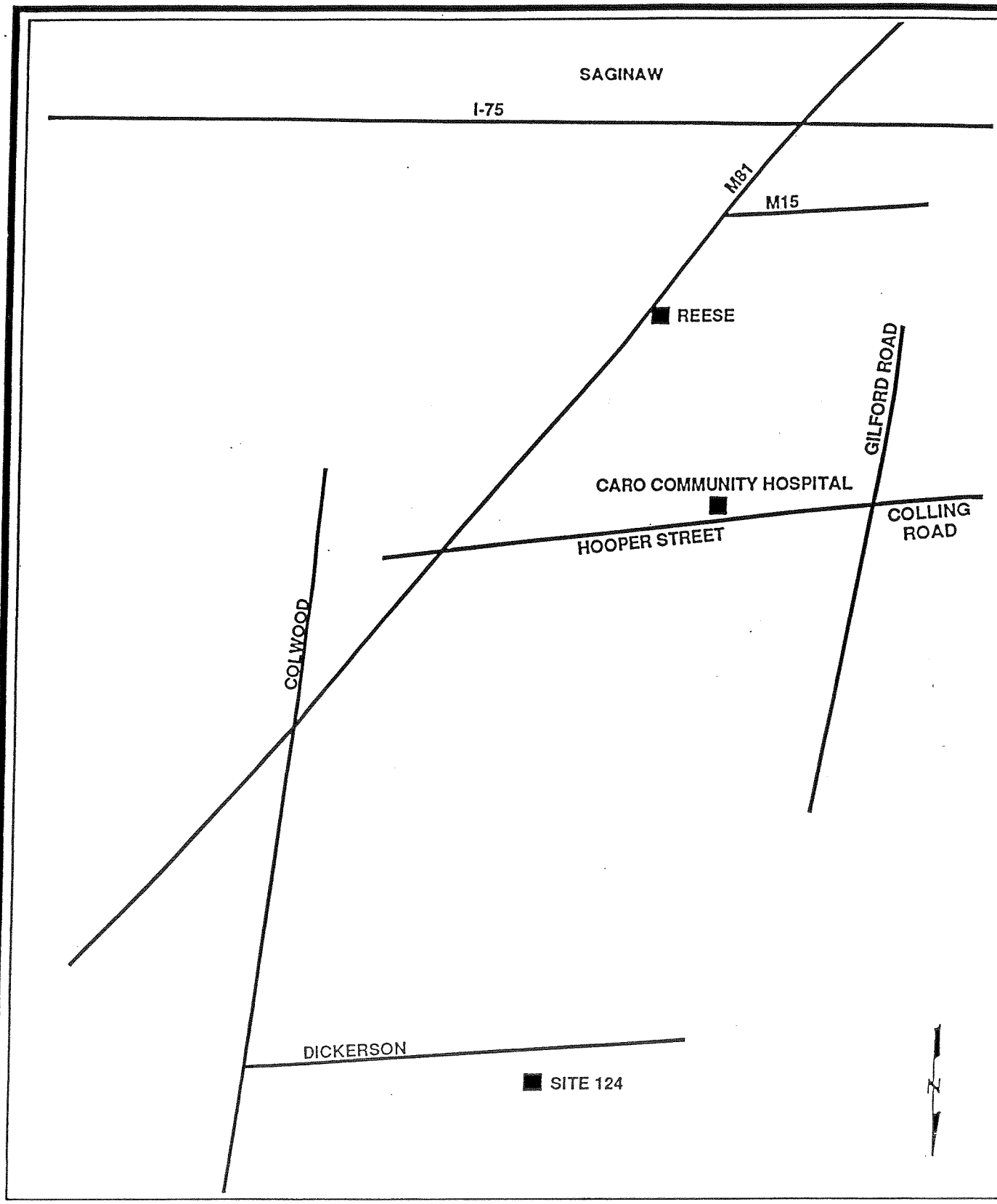
Electric Utility: Detroit Edison Company

Utility Phone: (800) 262-4391

Telephone Company: Century Telephone of Michigan Inc.

TelCo Phone: (800) 352-5858

Comments: Telephone repairs (800) 824-2877; Police: (517) 673-2156; Fire Dept: (517) 674-8661; Ambulance: (517) 674-8661 & 691-5511; Nearest Medical Facility Caro Community Hospital (517) 673-3141.



NEAREST MEDICAL FACILITY TO SITE 124

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number: **125** **(CND125)** Site Name: **Candor, NC** Updated: **10/29/01**

Shelter Telephone: **(910) 572-4580**

Directions to Site: From Greensboro take Highway 220 South toward Candor. Exit at 211 and head west into Candor. Take a left onto Alt 220 South. 731 West begins almost immediately and the road hears both names. Follow for 1.3 miles until the routes split. Take 731 West which veers right. Take an immediate right on McCallum Road (it has a sign for E-KU-SUMEE at this junction). Go 5.4 miles to Perry Drive, which goes left only. There are approximately six mailboxes at the end of the road. Follow the drive approximately 3/4 mile to end. Site is behind the house.

Hazards: recreational hunting Oct-Dec.

Emergency Contact: First Health of The Carolinas; (910) 576-0606

Emergency Phone: 911

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Pee Dee Electric

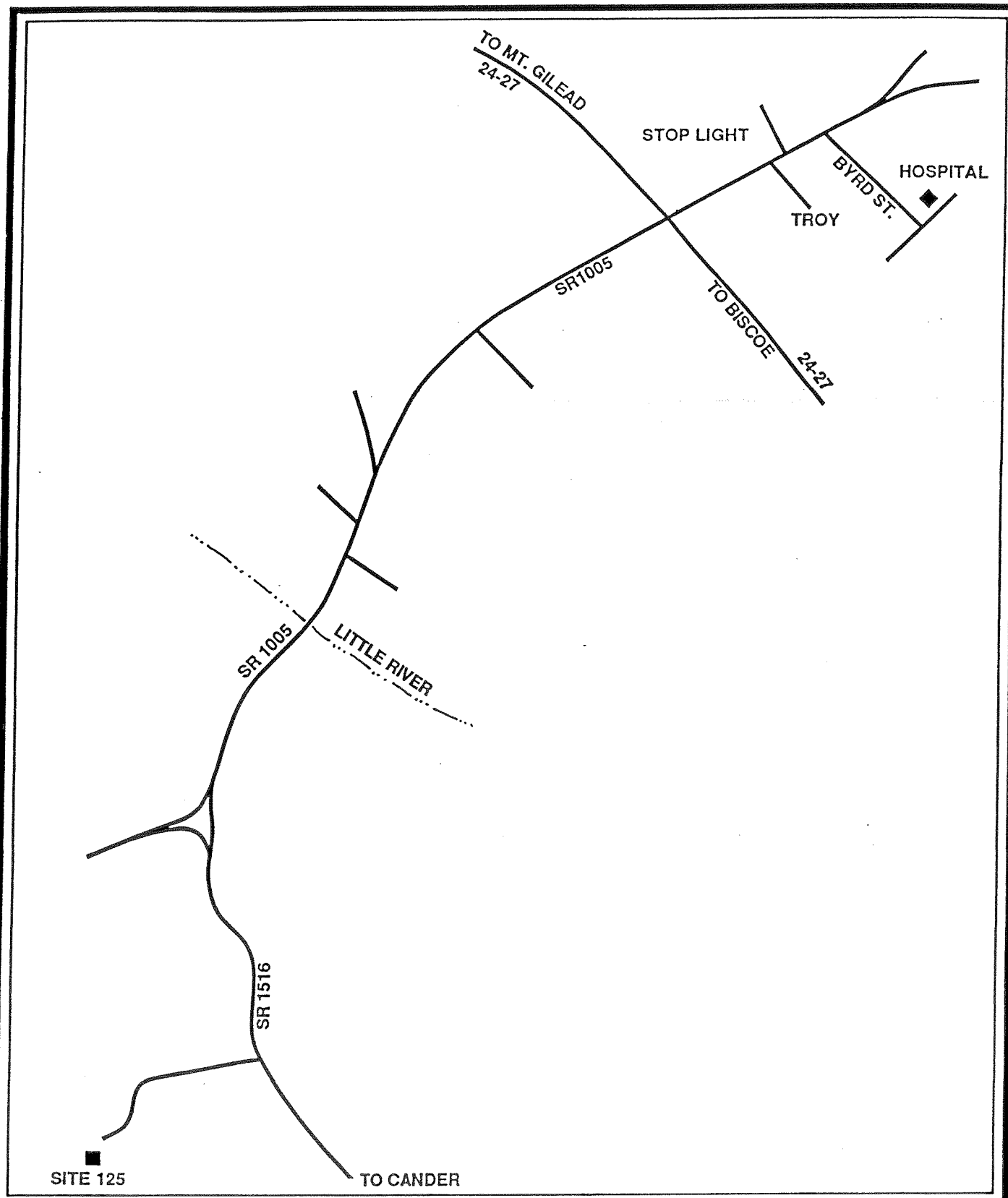
Utility Phone: (910) 997-4441

Telephone Company: Sprint

TelCo Phone: (800) 877-7746

Comments:

CASTNET SITE SAFETY #935S



NEAREST MEDICAL FACILITY TO SITE 125

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**126 (PNF126)**	Site Name: **Cranberry, NC**	Updated: **10/29/01**

Shelter Telephone: **(828) 733-1643**

Directions to Site: Leave Asheville, NC on US-19/23 driving north. Follow signs to US-19 then US-19E. On US-19E pass through Plumb Tree, NC then cross the North Toe River. After crossing the river drive about 3.1 miles and turn left on Roaring Creek Road, just past a white church called McCoury's Rock Baptist Church. After driving about 3.7 miles on Roaring Creek Road, bearing right at each of the two forks, the pavement ends. After the pavement ends, drive about 1/4 mile up a hill and turn right up into a driveway. The site is in a field and visible from the main road. (If you get to the town of Minneapolis, you have missed the turn for Roaring Creek Road.)

Hazards: recreational hunting

Emergency Contact: Sloop Memorial Hospital; (828) 733-9231

Emergency Phone: 911

Emergency Directions to Medical Facility: 4 miles from site to the mouth of Roaring Creek Rd. Take a left at the stop sign and go about 1.5-2 miles to Russells Antiques, turn right. Go about 6 miles until you come to where the road bears to the left and sharp turn to the right. Go right for about 3 to 4 miles. Post Office will be on the right. There is a road that cuts up left, immediately after the Post Office. Go up that road, hospital is on right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: NC-X28086

Electric Utility: Mt. Electric Coop

Utility Phone: (704) 733-0159

Telephone Company: BellSouth

TelCo Phone: (800) 945-6500

Comments:

CASTNet Site Contact List

Site Number: **127** **(ESP127)** Site Name: **Edgar Evins, TN** Updated: **10/29/01**

Shelter Telephone: **(615) 597-6556**

Directions to Site: Leave Knoxville on I-40 West. Pass Cookeville and take State Road 56 south at exit 273. Follow the sign to the Appalachian Center for Crafts. Just after crossing the Caney Fork River (before getting off the bridge in fact) take a hard left at the Center for Crafts sign. About 1 mile after leaving the highway, there is a driveway with a yellow gate on the right. The driveway is going uphill and the gate is above the main road. The site is at the end of the driveway.

Hazards: lightning strikes, lake at bottom of hill, rec hunting Aug-May

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site go to Hwy 56, head North, go to Hwy 70, turn right and go east for about 8 miles to Cookeville. Turn North on route 135, go about 0.25 miles. Cookevile General Hospital will be on right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Caney Fork Electric Co.

Utility Phone: (888) 505-3030

Telephone Company: Dekalb (DTC)

TelCo Phone: (615) 529-2955

Comments: Police, Fire Dept: (615) 597-4935; Ambulance: (615) 597-6767; Nearest Medical Facility: (615) 597-5715.

CASTNet Site Contact List

Site Number: 128 (ARE128) Site Name: **Arendtsville, PA** Updated: **10/29/01**

Shelter Telephone: **(717) 677-9866**

Directions to Site: From Gettysburg, PA take Business 15 (Access from Hwy 15), take Hwy 34 to Biglerville. At the red light take Hwy 234 (left) to Arendtsville. Bear to the left at stop sign just outside of Biglerville. Hwy 234 comes to a "T" intersection. Turn left, then turn right at the very next street (Chambersburg St.) Continue on this street until you pass a guardrail on the right, look for the very next drive/road on right and a sign that says "Boyer Nursery & Orchard, Inc." Site is visible on the hill at right. Turn right on this drive and go to barn on right. Turn right and follow trail to top of hill and site.

Hazards: N/A

Emergency Contact: Gettysburg Hospital; (717) 334-2121

Emergency Phone: 911

Emergency Directions to Medical Facility: From site go to white barn, turn left. Winding road approx .3 miles; there will be a stop sign, turn left onto Cashtown Road. Go .4 miles to stop sign (at Getty Mart), turn right, go two blocks to a stop sign, turn right onto Mummasburg Road. Go approx 5 miles toward Gettysburg. At the stop sign, turn left. Take Lincoln Avenue for 1 block, at stop sign, turn right onto Washington St., go approx 8 blocks to Gettysburg Hospital Emergency Entrance.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: X17247

Electric Utility: MET-ed

Utility Phone: (800) 545-7738

Telephone Company: United T elephone/Sprint

TelCo Phone: (800) 829-8009

Comments: Telephone repairs (800) 366-8204. Another telephone company phone (717) 632-1313.

CASTNet Site Contact List

Site Number:	**130**	**(BVL130)**	Site Name: **Bondville, IL**	Updated: **10/29/01**

Shelter Telephone: **(217) 863-2602**

Directions to Site: Take Hwy 10 West out of Champaign, IL to the town of Bondville. In the center of Bondville, 10 will intersect with Market Street. There will be a church on the right. Turn left onto Market Street. In 50 yards you will see some grain silos which will confirm you are on the correct road. Continue for approx 5 miles. You will be passing a large agricultural field. The site is on the right about 100 yards off the road.

Hazards: N/A

Emergency Contact: Carle Hospital; (217) 383-3311

Emergency Phone: 911

Emergency Directions to Medical Facility: See map.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

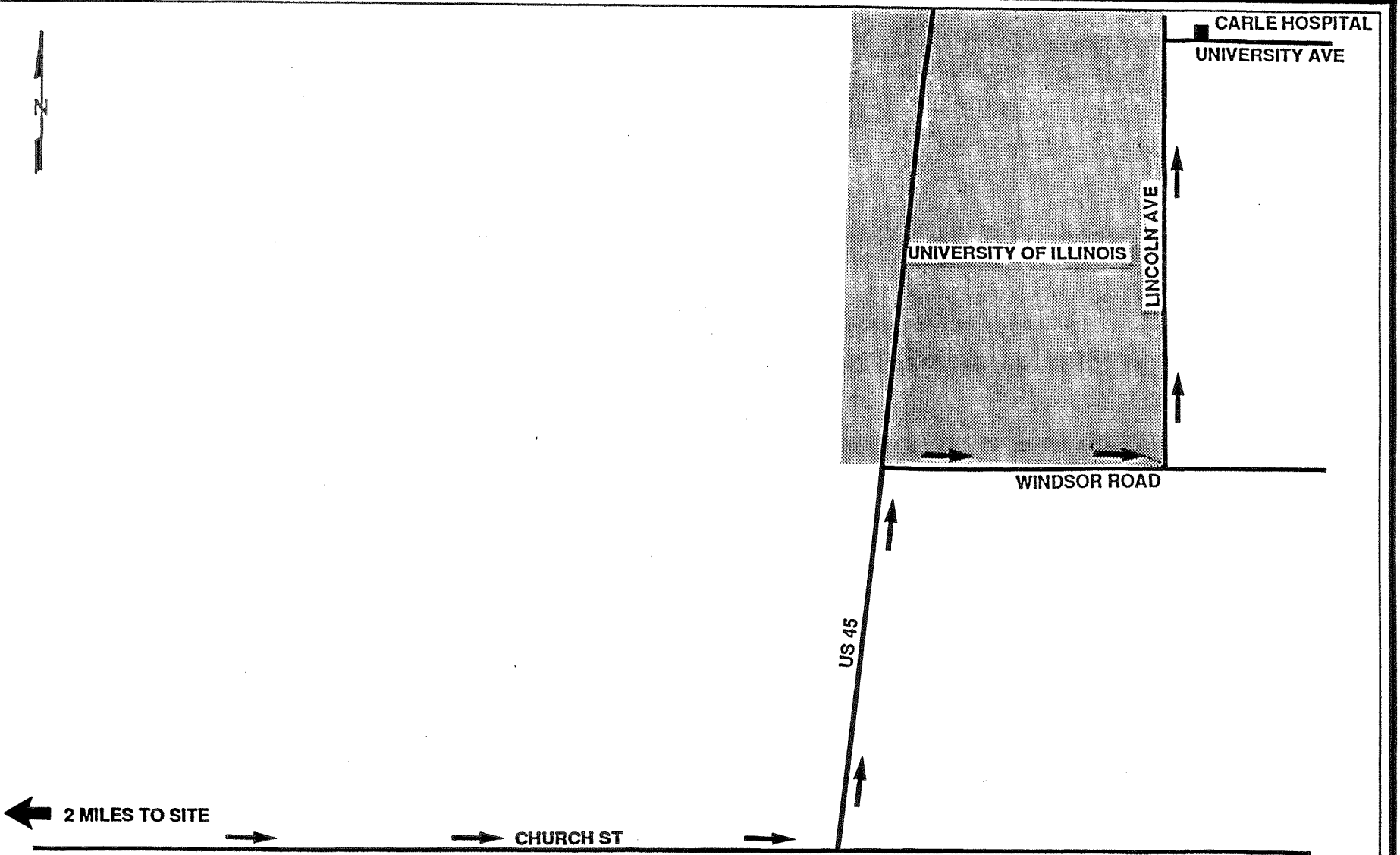
Electric Utility: Illinois Power Co.

Utility Phone: (800) 755-5000

Telephone Company: GTE

TelCo Phone: (800) 483-5600

Comments:



NEAREST MEDICAL FACILITY TO SITE 130

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number: **131** **(MCK131)** Site Name: **Mackville, KY** Updated: **10/29/01**

Shelter Telephone: **(606) 262-5181**

Directions to Site: From Danville, KY take US-150 West, following the signs to the Perryville Battlefield. Outside of town keep to the left to stay on Highway 52/150 west. After passing through the town of Perryville and crossing a small bridge take a quick right on County Road 1920 (there should be a Perryville Battlefield sign). After 6 miles on County Road 1920 cross a small bridge and bear right. About 1.6 miles past the bridge, turn left onto Wesley Miller Road. The pavement will end. After 1 mile on the gravel, the site is in the field on the left. The gate is on the left at the top of the hill.

Hazards: recreational hunting

Emergency Contact: James B. Haggin Memorial Hospital; (859) 734-5441

Emergency Phone: 911

Emergency Directions to Medical Facility: From site take 422 North to 152. Go east 12 miles to Harrodsburg. James B. Haggin Memorial Hospital will be on the right just after the junction of route 68.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Inter County RECC

Utility Phone: (606) 236-4561

Telephone Company: BellSouth

TelCo Phone: 557-6000

Comments: Telephone company phone outside of KY (800) 947-8398.

CASTNet Site Contact List

Site Number: 132 (HOW132) Site Name: **Howland, ME** Updated: **9/17/01**

Shelter Telephone: **(207) 745-6841**

Directions to Site: From Bangor, ME take I-95 North to Howland exit (Route 6/155). Take route 6 west 1.8 miles, pass the dirt road to the landfill on your right, take the next dirt road on the left. Go through the locked metal gate at the wooden bridge (LOCK-3061). The site is 1 mile past the bridge, behind a farm equipment storage building.

Hazards: hunters & trappers during open season.

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Take I-95 north to next exit (Lincoln-Exit 55). Proceed east off exit approx 5 miles, take left at 4 corners. Proceed to Lincoln. About 15 miles total from site 132.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Bangor Hydro Electric Co.

Utility Phone: (207) 947-2414

Telephone Company: Unicell

TelCo Phone: (800) 244-9979

Comments: Police, Fire, Ambulance: (207) 732-4105; Nearest Medical Facility: (207) 794-3321; Penobscot Valley Hospital, Tansalpine Road, Lincoln, ME. Utility 1-800-499-6600.

CASTNet Site Contact List

Site Number: 133 (SAL133) Site Name: **Salamonie Reservoir, IN** Updated: **9/17/01**

Shelter Telephone: **(219) 782-2428**

Directions to Site: From Fort Wayne, In take I69 and Hwy 24 (exit 102). Proceed on Hwy 24 West through Huntington and Andrews. Close to Lagro you will come to Hwy 524 South. Turn left on Hwy 524, cross river and the road turns left. Take the road that is on the left when 524 turns back to the right. This is Hanging Rock Road. Turn on Division Road, turn onto 600 E. Road, turn left on 50 S., turn right on 650 E., turn left on Salamoni Dam Road. Approx 4/10 mi ahead you will come to a farm complex. Turn left onto driveway and follow it around and past barn and house. You will pass right by the site.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site go out driveway, take a right on 50 South, take a left on 750 East, take a right onto Division Road, cross over State Road 105 and Rangeline Road, take a left onto State Road 9, get off at the Huntington Downtown exit. You will then be on Etna Avenue. Take Etna Ave. past the TAB on your left, then the Hoosier Drive Inn on the right. Huntington Memorial Hospital will be on your right, across from the liquor store.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Wabash, Co. REMC

Utility Phone: (219) 563-2146

Telephone Company: Ameritech

TelCo Phone: (800) 480-8088

Comments: Police: (219) 358-2308; Fire Dept: (219) 782-2011; Ambulance: (219) 356-1122; Nearest Medical Facility: Huntington Memorial Hospital.

CASTNet Site Contact List

Site Number:	**134 (PRK134)**	Site Name: **Perkinstown, WI**	Updated: **10/29/2001**

Shelter Telephone: **(715) 785-7989**

Directions to Site: Go West on 29 from Wausaw, WI to Abbotsford, WI. Go North on 13 approximately 4.5 miles past Medford, WI. Go West (left) on County "M" approximately 13 miles, just past 2 small bridges. Site operator's house is on right (has 3 car garage); site is behind house on hill. In summer use driveway to East of site ops house. In winter use site ops driveway to site.

Hazards: N/A

Emergency Contact: Medford Clinic & Memorial Hospital of Taylor County

Emergency Phone: 911

Emergency Directions to Medical Facility: See map. Memorial Hospital of Taylor County is approximately 17 miles from the site.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 5-6893

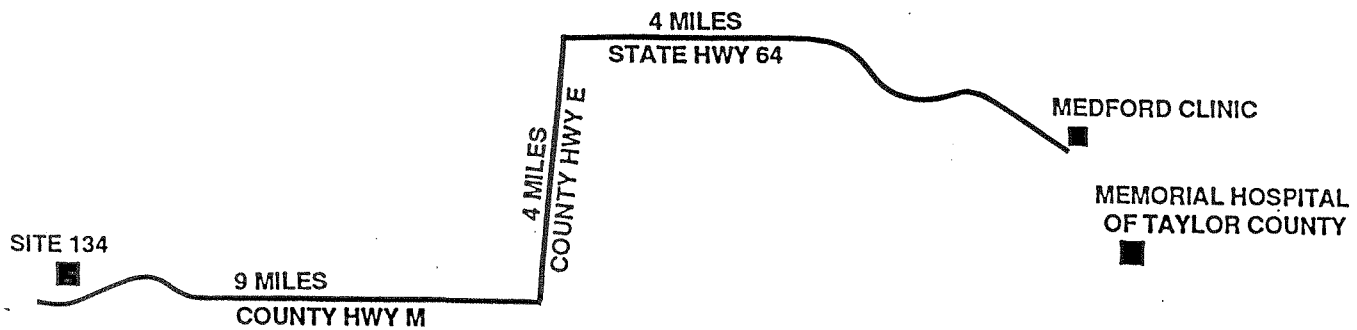
Electric Utility: Clark Electric Coop.

Utility Phone: (715) 267-6188

Telephone Company: TDS Telecom

TelCo Phone: (800) 929-5790

Comments: HOSPITAL NUMBERS: Medford Clinic (715) 748-2121; and Memorial Hospital of Taylor County (715) 748-8100.



NOTE:
APPROXIMATELY 17 MILES TO THE
NEAREST MEDICAL FACILITY

NEAREST MEDICAL FACILITY TO SITE 134

U.S.
Environmental Protection Agency

Clean Air Status and
Trends Network

CASTNet Site Contact List

Site Number:	135 (ASH135)	Site Name: **Ashland, ME**	Updated: **9/21/01**

Shelter Telephone: **(207) 435-6482**

Directions to Site: From Presque Isle, ME take 163 to Ashland (approx 20 miles; go through town to "T" junction of Hwy 11 (Ashland 1 Stop in front of you) turn left (South), go 0.5 mi, go right on Goding Road, go straight for 1.5 miles to site (do not follow hard curve to left of road). Lock combination is 0727.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site go east on Goding Road for 3/4 mile, turn north on Rt. 11. At the flashing red light on the intersection of Rt. 11 and 163, turn east and go approx 1/2 mile, turn north on Walker Street, Aroostock Valley Medical Center is first turn on the right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Maine Public Service

Utility Phone: (207) 764-3858

Telephone Company: NYNEX/Bell Atlantic

TelCo Phone: (800) 941-9000

Comments: Police: (207) 435-6626; Ambulance, Fire Dept: (207) 435-2200; Nearest Medical Facility Ashland, ME (207) 435-6341; Presque Isle (207) 768-4900. Telephone repairs (207) 555-1515.

CASTNet Site Contact List

Site Number:	136 (CKT136)	Site Name: **Crockett, KY**		Updated: **9/17/01**

Shelter Telephone: **(606) 522-3560**

Directions to Site: From Huntington, WV take I-64 west, approximately 2 miles, to exit 191 in Kentucky. Then take route 23 south to Paintsville, approx 55 miles. At the first traffic light in Paintsville (junction of 23 and 460/40) turn right, go for about 1/2 mile and then take Route 40 to the right. Follow route 40 for about 1-1/2 miles and then turn right onto Route 172. Stay on Route 172 for about 15 miles. Just past Paintsville Lake, turn left onto Route 437. Stay on Route 437 for 4 miles. D&K Grocery will be on the left. After D&K Grocery take the first dirt road to the right (about 0.1 mi.) Stay right past the barn (about 0.3 mi) then take the first left. Site is at the top of the hill.

Hazards: recreational hunting

Emergency Contact: see comments

Emergency Phone: 911

Emergency Directions to Medical Facility: Leave the site and turn right onto 437. Take 437 to I-72 and turn left. Take I-72 to 460 and turn right. Go through the city of W. Liberty to Morgan County Appalachian Regional Hospital. The hospital is on the right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Licking Valley RECC

Utility Phone: (606) 743-3179

Telephone Company: Mountain Rural Telephone 20200

TelCo Phone: (606) 743-3121

Comments: Nearest Medical Facility (606) 743-3186; Morgan County Appalachian Hospital, Wells Hill Road, West Liberty, KY 41472.

CASTNet Site Contact List

Site Number: **137** **(COW137)** Site Name: **Coweeta, NC** Updated: **10/29/01**

Shelter Telephone: **(828) 369-7919**

Directions to Site: Leave Atlanta on I-85. Exit the interstate on US-23 to Gainesville, GA. Stay on US-23 to the GA-NC border, it will become US23/441 about halfway there. Drive through Dillard, GA, cross the NC state line, then about 3.8 miles into NC turn left at the brown & white "Coweeta Hydrologic Lab" sign. Follow the signs to the experiment station; it is about 3 miles from the highway.

Hazards: lightning strikes, rec hunting year round, rattlers & copperheads

Emergency Contact: Angel Community Hospital; (828) 369-4211

Emergency Phone: 911

Emergency Directions to Medical Facility: From Coweeta Lab go 3 miles to US 441 north, go approx 11 miles into downtown Franklin, NC. Turn right on Palmer St. Go 1 mile and turn left on Riverview Street, go 1/4 mile, hospital is on left.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Nantahala Power

Utility Phone: (828) 524-2121

Telephone Company: GTE 318508356200698510

TelCo Phone: (704) 586-9121

Comments: Alternate phone company phone (800) 483-5300.

CASTNet Site Contact List

Site Number:	**138 (STK138)**	Site Name: **Stockton, IL**	Updated: **10/29/2001**

Shelter Telephone: **(815) 947-9003**

Directions to Site: From Chicago take RT 90 West to Rockford. From Rockford, take RT 20 West to Stockton. At the light in Stockton (Main Street) turn left (South) on RT 78. About 2.7 miles south of Stockton, RT 78 curves to the right and Ridge Road (which is dirt) continuing straight. Take the dirt road. There will be a stop sign at about 100 ft. Continue straight for about 1.1 miles. Go AROUND THE HILL with the mobile home on top. On the other side of the hill, Ridge Road turns right, but go straight on the "DEAD END" dirt road. Site operators live in the farm house 1/4 mile on the right. The site is further up the road past the house, barn, and shed on the left.

Hazards: N/A

Emergency Contact: Stockton Family Health Center; 109 N. Main, (815) 947-2155

Emergency Phone: 911

Emergency Directions to Medical Facility: From site go west on E. Parker Road 1.5 miles to Hwy 78. Take a right on Hwy 78 North to Stockton, approx 3.5 miles. Go 1 mile through Stockton and the Health Center will be on your right. Stockton Family Health Center, 109 N. Main, Stockton, IL 61085. Phone: (815) 947-2155.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Commonwealth Edison (ComEd)

Utility Phone: (800) 334-7661

Telephone Company: GTE

TelCo Phone: (800) 483-2000

Comments:

CASTNet Site Contact List

Site Number: **139 (BWR139)** Site Name: **Blackwater NWR, MD** Updated: **10/29/2001**

Shelter Telephone: **(410) 221-8624**

Directions to Site: Take Hwy 50 east to Cambridge, MD. Turn right on Woods Road, located at mile marker 81. There is a Hardee's on the corner. (if you are on the correct road, you will pass the town water tower). Go approx 1 mile to a stop sign. Turn right onto SR 16 West. Go 1.7 miles and turn left on Egypt Road. There will be a white building marked "D.D.U.-S.T. Store" on the corner. Go 7.1 miles to stop sign at "T" intersection. Turn right (towards the visitor's center). Go 0.8 mile to gated drive on left. The site will be visible from the gate.

Hazards: ticks, propane cannon

Emergency Contact: Dorchester General Hospital, 300 Byrn St, Cambridge, MD

Emergency Phone: (410) 228-5511,911

Emergency Directions to Medical Facility: Go back to route 50 and turn west toward Cambridge. Follow the blue hospital signs. SEE MAP.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

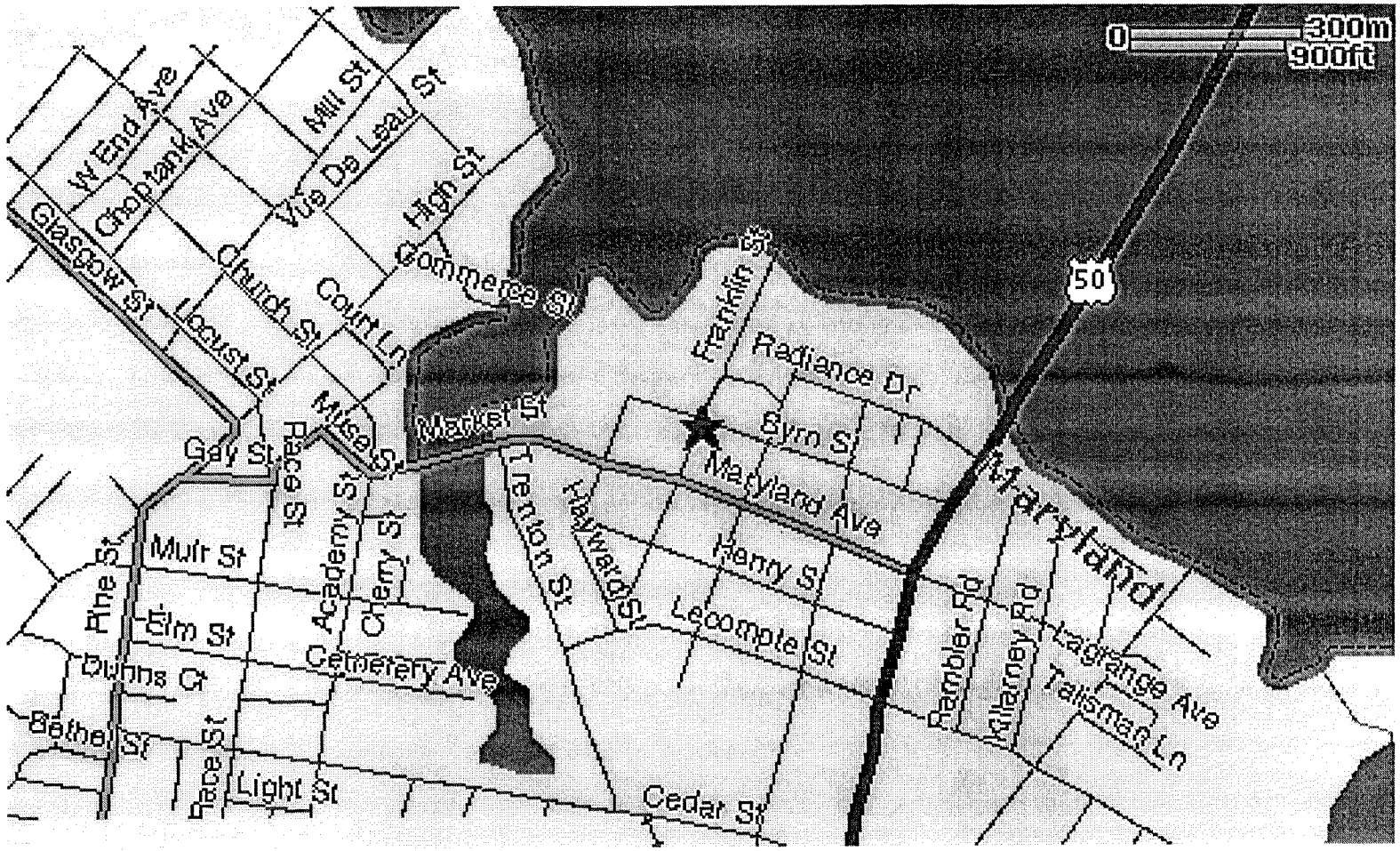
Electric Utility: Choptank EMC

Utility Phone: (410) 228-1626

Telephone Company: Bell Atlantic

TelCo Phone: (800) 440-8000

Comments:



Nearest Medical Facility to Site 139

Source: Vacinity Corp, GOT, 2001; MapQuest.com, Inc.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**140 (VIN140)**	Site Name: **Vincennes, IN**	Updated: **10/29/01**

Shelter Telephone: **(812) 886-0177**

Directions to Site: Take Hwy 50 to Vincennes, IN. Take Hwy 41 North approx 2 to 3 miles until you see the sign for the Purdue Agricultural Center. Turn left. The drive to the center veers left, the road to the site continues straight.

Hazards: farm spray shed & summer thunderstorms

Emergency Contact: Medical Center of Vincennes; (812) 882-1106

Emergency Phone: 911

Emergency Directions to Medical Facility: From SW Purdue Agricultural Center go West on U.S. 41, take the U.S. 50/41 By-Pass south. Take the SR 441 exit north into Vincennes. Exit onto south 6th St. Distance from farm to hospital is approx 10 miles.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: REMC

Utility Phone: (812) 882-5140

Telephone Company: Indiana Bell

TelCo Phone: (812) 556-3200

Comments:

CASTNet Site Contact List

Site Number: **141 (IRL141)** Site Name: **Indian River Lagoon, FL** Updated: **10/29/2001**

Shelter Telephone: **(561) 538-2365**

Directions to Site: From I-95 take exit #71, 192 east. Proceed to A1A and go approx 20 miles south. Cross the Sebastian Inlet Bridge, turn right (west) into the recreation area . After passing the welcome booth, follow the road as far west as possible, the site is on Coconut Point.

Hazards: N/A

Emergency Contact: Indian River Memorial Hospital, 1000 36 St., Vero Beach, FL

Emergency Phone: (561) 567-4311,911

Emergency Directions to Medical Facility: SEE MAP.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: FPL

Utility Phone:

Telephone Company:

TelCo Phone:

Comments:

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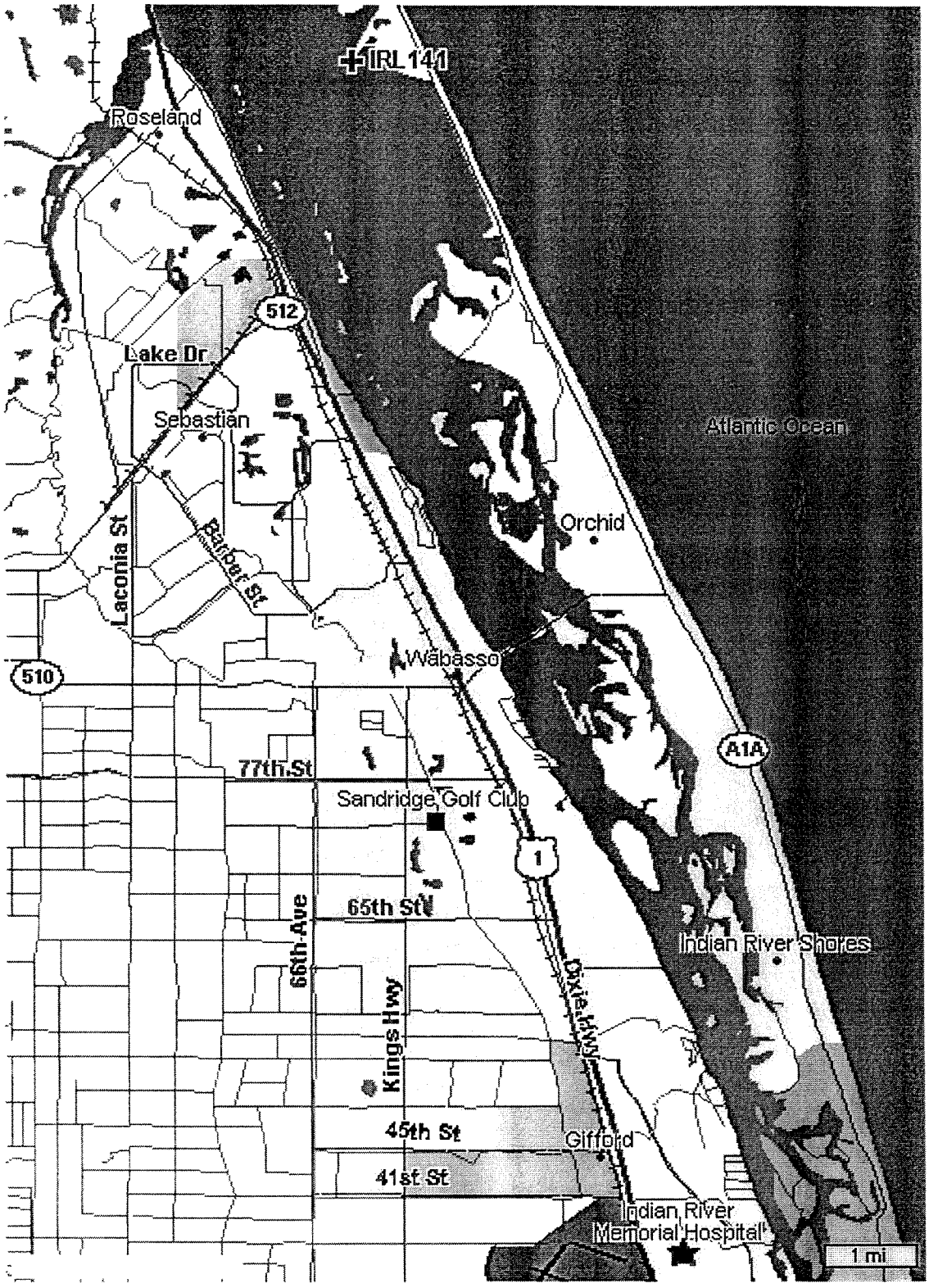

Nearest Medical Facility to Site 141

Source: Vacinity Corp, GOT, 2001; Mapblast.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**142 (BFT142)**	Site Name: **Beaufort, NC**	Updated: **10/29/01**

Shelter Telephone: **(252) 728-1504**

Directions to Site: From Durham/Raleigh, NC take I-40 East to exit 306 (Hwy 70). Take Hwy 70 East to Beaufort, continue through town. About 5 miles outside of town at the intersection of Carteret High School and 70 East, go straight through the light (Marrimon Road) and do not follow Hwy 70. After approx 6 miles you will come to the entrance of Open Grounds Farm on right. Check in with guard at gate and continue 1 mile to 1st dirt road on left. Take another left; site is visible in far corner of field.

Hazards: area subject to lightning strikes in summer.

Emergency Contact: Carteret General Hospital, 3500 Arendell St (Hwy 70)

Emergency Phone: (252) 247-1616,911

Emergency Directions to Medical Facility: Hospital is in Morehead City. From site take dirt road to Merrimon Road, then Merrimon Road approx 7 miles to Hwy 70. Take Hwy 70 approx 10 more miles to Morehead City. (Hospital is approx 22 miles from site). Carteret General Hospital, 3500 Arendell Street (Hwy 70), Morehead City, NC 28557. Phone: (252) 247-1616.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: E27-325

Electric Utility: Carteret Craven Electric Coop

Utility Phone: (800) 682-2217

Telephone Company: Sprint

TelCo Phone: (252) 633-9016

Comments:

CASTNet Site Contact List

Site Number:	144 (WSP144)	Site Name: Wash. Crossing, NJ	Updated: 9/21/01
Shelter Telephone:	(609) 737-3271		
Directions to Site:	Lock Combinations: Top lock=1903 W.C. lock=key. Out of Philadelphia take 95 North to 29 North (Lamberton/Trenton exit) the last exit in PA. Go 2.7 mi and make a right on CR 546-there is a BP Station and a sign indicating that this is the turn for the main park entrance. Go 1.4 mi and make a left on Bear Tavern Road (green park office on the corner). Go 0.6 mi and make a left on Church Road. Go 0.8 mi and look for a wooden gate across a gravel drive. You will pass the intersection of Fiddlers Creek Road and see a yellow diamond shaped warning sign, go around a curve, past a house on the left, followed by a short stretch of woods, a short stretch of clearing and another short stretch of woods. The gate is marked WCRC-FA and sits back about 10 feet from the road. Closest hotels are in Lawrenceville. Out of		
Hazards:	N/A		
Emergency Contact:	see comments		
Emergency Phone:	see comments		
Emergency Directions to Medical Facility:	From site 144 turn left onto Church Rd. At traffic light turn left onto Rt. 29. Follow signs to Trenton. At light (at Upper Fery Rd.) turn left, then right onto River Rd. At light (at Lower Ferry Road) turn left. Go past next light.		

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number:	N/A
Electric Utility:	GPU Energy
Utility Phone:	(800) 662-3115
Telephone Company:	Bell Atlantic
TelCo Phone:	(800) 640-9911

Comments: Police: (609) 737-3100; Ambulance, Fire Dept: (609) 466-1616; Nearest Medical Facility Mercer Medical Center (609) 394-4000.

CASTNet Site Contact List

Site Number:	**145 (LYE145)**	Site Name: **Lye Brook, VT**	Updated: **10/29/2001**

Shelter Telephone: **(802) 375-3205**

Directions to Site: From Albany, NY take Rt. 7 East to Bennington, VT then North to Arlington. From Arlington, VT turn East on East Arlington Road. Near the Norman Rockwell Museum, drive about 1 mile to Old Mill Road, just over the river and before the Chipperhook Store. Turn right on Old Mill Road and drive about 1.5 miles where you will cross a single lane bridge. This road will fork, bear right toward "Kelly Stand." The road becomes dirt at this point. Drive for 5.2 miles following the river. There will be a gate on the right painted brown with reflective signs. Hike up trail to the site, take a left at 1st clearing; approx 3/4 mile.

Hazards: N/A

Emergency Contact: Southwestern Vermont Medical, 100 Hospital Dr., Bennington, VT

Emergency Phone: (802) 442-6361,911

Emergency Directions to Medical Facility: From the site, return to the dirt road and proceed west to the first paved road. Turn left on the paved road and left again after crossing Route 7 (follow the signs to Route 7). Go South on Route 7 to Bennington, VT. Follow the blue Hospital signs to the hospital. SEE MAP.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: None

Utility Phone: N/A

Telephone Company: Cellular One

TelCo Phone: (800) 215-7004

Comments: SHIP TO FOR BACK-UP: Red Barn House, 29 Depot Street, Proctorsville, VT 05153

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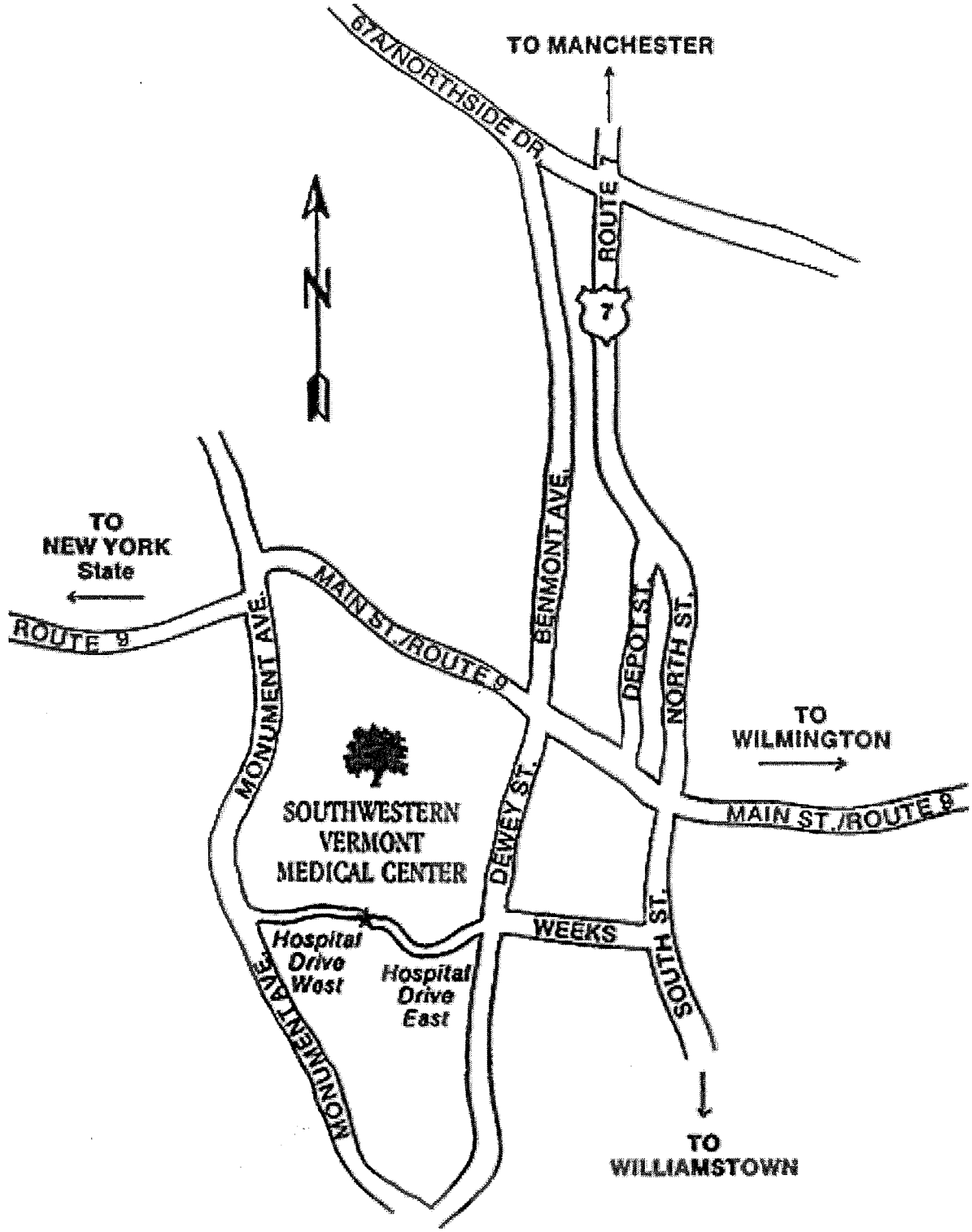

Nearest Medical Facility to Site 145

Source: Vacinity Corp, GOT, 2001; Mapblast.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**147 (ABT147)**	Site Name: **Abington, CT**	Updated: **10/29/01**

Shelter Telephone: **(860) 974-2273**

Directions to Site: From Hartford, CT take RT 84 East. At Exit #69 take RT 74 East to RT 44. Take RT 44 East to Abington. At the light in Abington, turn right (south) on RT 97. Go about 1.3 miles to a single lane paved road on the left, (Ayers Road). The road is past the apple cider store and just before the rabbit farm. There is a red barn type building on the corner. The site operator lives 1/4 mi up the dirt road on the right. the site is further up the road past the barn, in the field.

Hazards: adjacent areas frequented by hunters

Emergency Contact: Day Kimball Hospital, 320 Pomfret St, Putnam, CT

Emergency Phone: (860) 928-6541,911

Emergency Directions to Medical Facility: From site (Ayers Road), follow Route 97 to Route 44 East. Take Route 44 East to Putnam, CT. Day Kimball Hospital is on Route 44 before you get into Putnam. 320 Pomfret Street, Putnam, CT (203) 928-6541.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: OE5-699

Electric Utility: Connecticut Light & Power

Utility Phone: (800) 286-2000

Telephone Company: SNET

TelCo Phone: (800) 962-0273

Comments: Additional backup site operator: Loring White, 83 Crystal Pond Road, Eastford, CT, 06242, (860) 974-0819.

CASTNet Site Contact List

Site Number: **149** **(HOX149)** Site Name: **Hoxeyville, MI** Updated: **10/29/01**

Shelter Telephone: **(231) 862-3750**

Directions to Site: From Cadillac, proceed west on route 55 approx 12.5 miles. The entrance to Caberfae Ski Resort should be visible on the right (north) side of the road. Turn left, heading south on Hoxeyville Rd (S13). Go approx 2 miles to the first stop sign. There is a Church at the intersection. Turn right, heading west. The road is not marked. Go approx 2 miles to "9" road. Turn left, heading south. This is a dirt road. If you come to a curve to the north back to route 55, you went too far and missed 9 road. Go approx 1 mile on 9 road, before reaching any intersections. The site is in a field on the left.

Hazards: recreational hunting 11/15 to 11/30

Emergency Contact: Mercy Hospital,400 Hobart St., Cadillac, MI

Emergency Phone: (231) 876-7200,911

Emergency Directions to Medical Facility: From site, go north on dirt road 9. Turn right and go east about 2 miles to Hoxeyville Road (S13) turn left. Follow S13 2 mile to route 55 (east) into Cadillac and follow the blue Hospital signs to Mercy Hospital (approx. 15 miles from site). SEE MAP.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Consumers Energy

Utility Phone: (800) 477-5050

Telephone Company: Ace Telephone Co.

TelCo Phone: (616) 885-9900

Comments:

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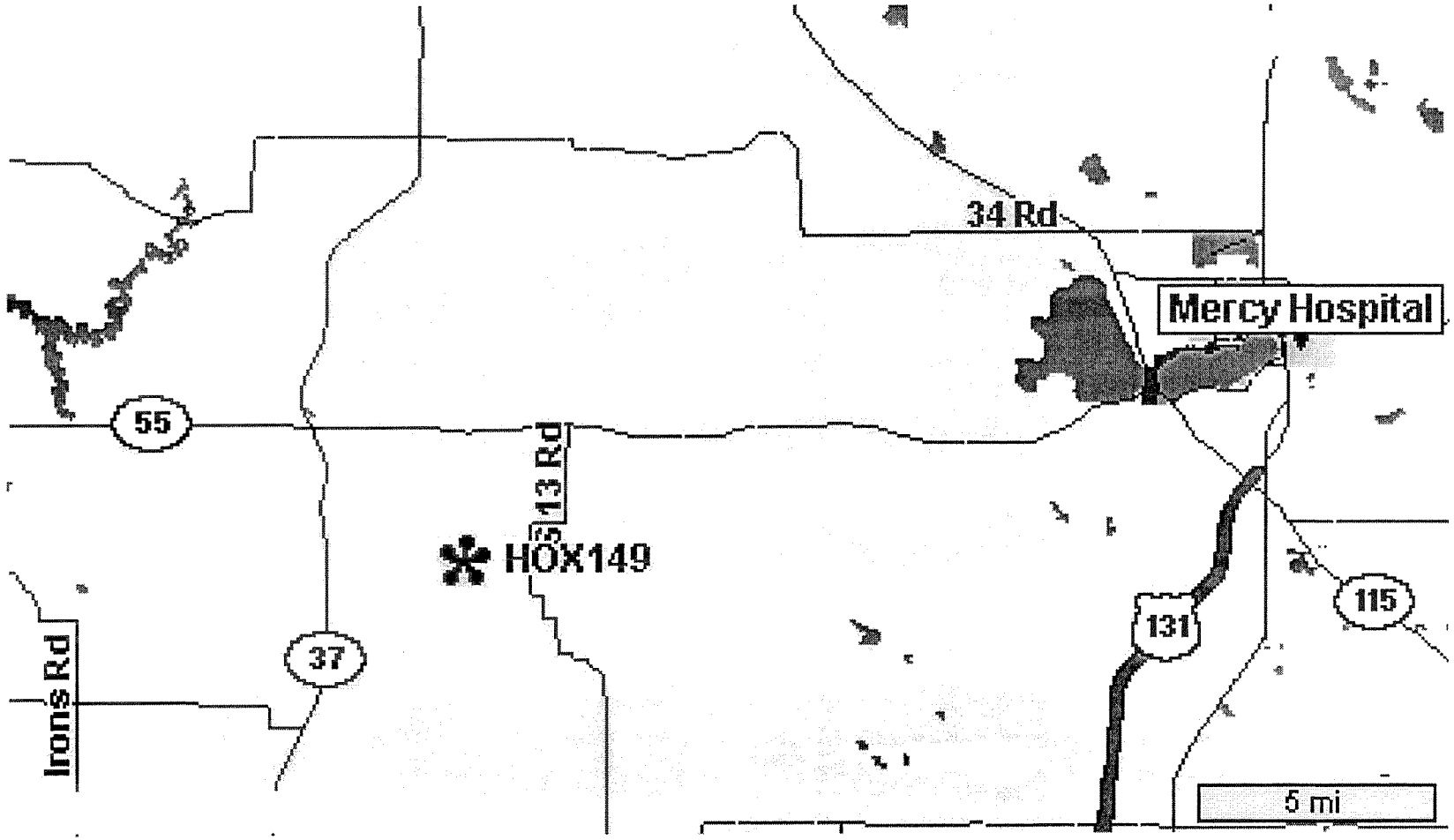


Nearest Medical Facility to Site 149

Source: Vacinity Corp, GOT, 2001; MapQuest.com, Inc.

U.S. Environmental Protection Agency

Clean Air Status and Trends Network

CASTNet Site Contact List

Site Number:	**150 (CAD150)**	Site Name: **Caddo Valley, AR**	Updated: **9/17/01**

Shelter Telephone: **(870) 246-0030**

Directions to Site: Out of Little Rock, AK take I-30 West. Go approx 70 mi and take exit 78 marked Caddo Valley, Hwy 7. Turn north, make an immediate turn West on Hwy 390 (located next to I-30 East on ramp) follow for 0.9 mi to site.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site 150 take Hwy 390 back to Caddo Valley. Get on I-30 West and go to Exit 73 (approx 4 mi). Turn left and go over Interstate then take the first left. Go to the first stop sign and you're there.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Entergy

Utility Phone: (800) 368-3749

Telephone Company: Southwestern Bell

TelCo Phone: (800) 327-3699

Comments: Police: (870) 246-4545; Fire Dept: (870) 246-8822; Ambulance, Nearest Medical Facility (870) 245-1000 Baptist Medical Center of Arkadelphia.

CASTNet Site Contact List

Site Number: 151 (CVL151) Site Name: Coffeeville, MS Updated: 9/21/01

Shelter Telephone: (662) 623-7334

Directions to Site: Take I-55 North out of Grenada, MS. Just out of town, take exit 220 for Hwy 330. Go east 5.1 mi, on the left you will see a USDA sign for Yalobusha Work Center (Forest Service) and Jamie L. Whitter Plant Materials Center (Soil Conservation Service). Enter the complex, proceed just past the wood fence and turn left on Forestry Road 802. Follow it 1.5 mi (to fire tower), turn left at Forestry Road 809 an drive 0.3 mi. Site is visible to the left.

Hazards: recreational hunting late November through January

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site 151 go to Hwy 330 go East to Coffeeville. Turn North on Hwy 7, turn right on Hwy 330 E (Main Street), go past Courthouse, cross over Center Street and take a left onto Kennedy Street. Coffeeville Family Health Clinic is on left.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Tallahatchie Valley

Utility Phone: (601) 675-8540

Telephone Company: BellSouth

TelCo Phone: (800) 622-0644

Comments: Police: (601) 675-2444; Fire Dept: (601) 675-2642; Ambulance: (601) 675-2902; Nearest Medical Facility Coffeeville Family Health Clinic: (601) 875-8436.

CASTNet Site Contact List

Site Number: **152** **(SND152)** Site Name: **Sand Mountain, AL** Updated: **10/29/01**

Shelter Telephone: **(256) 528-7175**

Directions to Site: From Gadsden, AL take I-59 North approx 20 mi. Take exit 205 for Hwy 68 & Crossville. Go west arppox 15 mi, just inside the city limits of Crossville. Site is on the right behind houses in the Sand Mountain Experimental Station.

Hazards: N/A

Emergency Contact: see comments

Emergency Phone: 911

Emergency Directions to Medical Facility: From site 152 turn right on Hwy 68, go past the bank and the school, there will be a Doctor's Office on your left approx 1.5 miles from site. To get to B+A Hospital, go past the Dr.'s Office until you get to Hwy 169, take a left, go to Hwy 431, take a right, hospital is approx 12 miles from site.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Marshall Dekalb Electric-Vickie

Utility Phone: (205) 593-4262

Telephone Company: TDS Telecom

TelCo Phone: (256) 927-4444

Comments: Doctor's Office: (256) 528-7173; B+A Hospital: (256) 528-7131.

CASTNet Site Contact List

Site Number: **153** **(GAS153)** Site Name: **Georgia Station, GA** Updated: **10/29/01**

Shelter Telephone: **(770) 229-8542**

Directions to Site: Take I-75 to the south side of Atlanta, GA. Pick up 19/41 South. Continue approx 30 mi through Griffin (PASS EXIT MARKED GEORGIA STATION). Take Williamson Road exit, turn right on Hwy 362 West. Go 7.2 mi on 362 (road jogs right in front of BP station) and then veer right on a dirt road marked Blanton Mill Road. Go 0.9 mi to the Roswell P. Bledsoe Experimental Farm. Enter the complex and take the right fork in the road. Turn left on road across field to site.

Hazards: frequent lightning strikes

Emergency Contact: Spalding Regional Hospital (770) 229-8059

Emergency Phone: 911

Emergency Directions to Medical Facility: From site follow Hwy 362 to Griffin. Spalding Regional Hospital.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Georgia Power

Utility Phone: (770) 567-8717

Telephone Company: BellSouth

TelCo Phone: (404) 780-2800

Comments:

CASTNet Site Contact List

Site Number:	**156 (SUM156)**	Site Name: **Sumatra, FL**	Updated: **10/29/01**

Shelter Telephone: **(850) 670-8376**

Directions to Site: Out of Tallahassee, FL take Hwy 20 West to town of Hosford (approx 25 mi). At the flashing light make a left onto Hwy 65. Go 22 miles and make a right onto a dirt road. Go left at 1st fork. The site can be seen approx 1/4 mi on the right.

Hazards: recreational hunting and frequent lightning strikes

Emergency Contact: Calhoun Liberty Hospital, 424 Burns Avenue,

Emergency Phone: (850) 674-5411

Emergency Directions to Medical Facility: From site take State Road 65 north to Highway 12. Continue north to Bristol. Go west on Hwy 20 to Blountstown. Take Hwy 71 north to Charlie E. Johns Street, turn east on Burns Avenue, where hospital is located.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: FL1028

Electric Utility: Talquin Electric

Utility Phone: (850) 627-9666

Telephone Company: GT Com

TelCo Phone: (850) 229-7231

Comments: Ambulance/Police: (850) 643-2235; Fire Dept: (850) 643-2400.

CASTNet Site Contact List

Site Number: **157** (ALH157) Site Name: **Alhambra, IL** Updated: **9/17/01**

Shelter Telephone: **(618) 675-3712**

Directions to Site: From Highlands, IL take 160 North through the town of Grantfork. Approx 1.2 mi north of town there is a large sign that marks the entrance to Cool Creek Estates Campground. Go 0.6 mi beyond that sign and turn right (white community township building on corner). Go to 2nd crossroads (approx 2.1 mi) and turn left, there is a pig farm on the left. Go 0.9 mi and the site is on the right, across an agricultural field. Enter through the farm just beyond the field.

Hazards: farm buildings, pond, lightning strikes, electric fence w/cattle

Emergency Contact: see comments

Emergency Phone: 911

Emergency Directions to Medical Facility: From site take a right on Fairview Road, take a left on Meffert Road, take a right on Ludwig Road. Ludwig Road will "T" into State Route 140. Go left on SR 140 towards Alhambra. Hospital is located in Alhambra.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 6X2216

Electric Utility: Southwestern Electric

Utility Phone: (618) 664-1025

Telephone Company: Alhambra-Grantforks Telephone

TelCo Phone: (618) 488-2165

Comments: For 911 system use the following street address for site: 5900 Fairview Road, Pocahontas, IL 62275. Alternate phone number for Southwestern Electric: (800) 664-1025.

CASTNet Site Contact List

Site Number: **161** **(GTH161)** Site Name: **Gothic, CO** Updated: **10/29/01**

Shelter Telephone: **(970) 349-5691**

Directions to Site: From Gunnison, Co, take Hwy 135 north to the town of Crested Butte (28 miles). You will arrive at a 4-way stop sign in town. Proceed straight ahead (137). This road will wind and pass through the village of Mt. Crested Butte. Stay on Gothic Road (137). You will pass the Ranger/Police Station and road will turn into a dirt road. Continue on the dirt road, you will cross two cattle gates and 1 small bridge. Upon approaching the second small bridge (15 feet) pull over to the right and park in visitor's parking area. The site is located at the top of the hill on the right and a visible foot path can be used to get there.

Hazards: N/A

Emergency Contact: Crested Butte Mountain Clinic (970) 349-2677

Emergency Phone: (970) 349-2525,911

Emergency Directions to Medical Facility: From site go south on the dirt road back to Mount Crested Butte. The medical facility is marked with a red cross on your left.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Gunnison County Electric Associates

Utility Phone: (970) 641-3520

Telephone Company: US West Communications

TelCo Phone: (970) 244-4800

Comments:

CASTNet Site Contact List

Site Number: **165** **(PND165)** Site Name: **Pinedale, WY** Updated: **10/29/01**

Shelter Telephone: **(307) 367-6584**

Directions to Site: Off 191 in Pinedale (locally called Pine) turn on Lake Road (between general store and Z-tire). Go Northeast (road only goes one direction off 191). Site is at top of ridge on right of road 6.2 mi from turnoff.

Hazards: N/A

Emergency Contact: Pinedale Medical Clinic, 619 E. Hennic St., Pinedale, WY

Emergency Phone: (307) 367-4133,911

Emergency Directions to Medical Facility: From site go back toward Pinedale, about 5 miles. The medical facility is on the left just past the ball field.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Pacific Power

Utility Phone: (800) 221-7070

Telephone Company: CenturyTel

TelCo Phone: (888) 835-2305

Comments:

CASTNet Site Contact List

Site Number: **169** **(CNT169)** Site Name: **Centennial, WY** Updated: **10/29/01**

Shelter Telephone: **(307) 742-7229**

Directions to Site: From Laramie, WY get on Hwy 130/230 at I-80 exit. Head south for 1/2 mile, take 130 to Centennial, WY (28 miles). Continue through Centennial, up hill and past the information center, continue for a total of about 6 miles, until you see the "Mt. Meadows Cabins" sign. A sign with Nash Fork will also be seen. Turn right (Rt. 317), continue straight through the intersection and bear to the right at the "Y" intersection. Brooklyn Lake will be on your left and a "Mountain Chapel" on the right. Park at the Chapel and go uphill to the left of the chapel to the site.

Hazards: N/A

Emergency Contact: Ivinson Memorial Hospital, 255 N. 30 St., Laramie , WY

Emergency Phone: (307) 742-2141

Emergency Directions to Medical Facility: From the site go back through the town of Centennial to Highway 130. Go to Laramie and take I-80 east to 287 Exit. Take 287 north to 30. Go east on 30 o 30th St. Follow Blue Hospital signs.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Carbon Power and Light

Utility Phone: (307) 326-5206

Telephone Company: Mt. Bell-US West Communication

TelCo Phone: (800) 603-6000

Comments:

CASTNet Site Contact List

Site Number:	**171** (CDZ171)	Site Name: **Cadiz, KY**	Updated: **10/29/01**

Shelter Telephone: **(270) 522-9373**

Directions to Site: From Hopskinville, KY take 68 West to Cadiz, KY. At the edge of Cadiz, pick up Alt. 68 West and take it through town. Cross the river. Take a left at the top of the hill (at the caution light), onto 1175 South. Go 4.75 miles and turn right on a gravel drive. The drive is just past D. Thomas Road which is on the left. Follow the drive to the end (approx 250 yds), it dead ends at the site compound. The site operator's home is just north of the site on D. Thomas Road.

Hazards: hunters during season

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Out of shelter driveway, turn left on Old Dover Highway (Hwy 1175). Proceed 4.7 miles. Take US 68 left. Proceed 1.5 miles to Trigg Co. Hospital, located on east side of US 68.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Pennyrile Rural Electric

Utility Phone: (800) 297-4707

Telephone Company: BellSouth

TelCo Phone: (800) 947-8398

Comments: Police/Fire: (270) 522-8888; Ambulance/Medical (270) 522-3215, Trigg County Hospital, Hwy 68, E. Main Street, Cadiz, KY 42211.

CASTNet Site Contact List

Site Number: **172** **(QAK172)** Site Name: **Quaker City, OH** Updated: **9/17/01**

Shelter Telephone: **(740) 679-3345**

Directions to Site: Out of Columbus, OH take I-70 E for approx 90 miles. Take Exit 193 for Quaker City/Hwy 513. Take Hwy 513 South approx 6 miles to Quaker City. At the stop sign in the center of town, take a right on Hwy 265. Go approx 0.75 mi and turn left on Yoker Valley Road (this is the first paved road to the left). Go approx 2.1 miles until you come to the top of a long hill. Veer right on the dirt road marked Noble County 34 (this is St. John's Road). Follow this road until you see the 2ND house on the right which has a big red workshop behind it. The house is several miles from the junction of Yoker Valley Road. You are now at the site operator's house. The site is in the hay field at the top of the hill across the road from the site operator's house. The access road is just beyond the house, around the curve to the left. It cannot be

Hazards: hunters during season

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site take St. John's Road (County Road 34) to Yoker Valley Road. Take Yoker Valley Road to State Route 265 East through Quaker City to Barnesville. Turn left at first intersection. Second stoplight, turn left.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: 4E4-828

Electric Utility: Gurnsey-Muskingum Elec Coop

Utility Phone: (740) 826-7661

Telephone Company: Alltell Ohio (Western Reserve)

TelCo Phone: (614) 349-8780

Comments: Police: (740) 732-4158 Noble Cty. Sheriff; Fire/Ambulance: (740) 679-2211 Quaker City; Nearest Medical: (740) 425-3941, Barnesville Hospital, 639 West Main Street, Barnesville, OH 43713.

CASTNet Site Contact List

Site Number:	**175** **(CAT175)**	Site Name: **Claryville, NY**	Updated: **10/29/01**

Shelter Telephone: **(914) 797-0947**

Directions to Site: From Newburgh, NY take 84 West to 17 West. Take 17 West to Exit 100 in Liberty (Route 52). At stop sign, go left "to 52" about 1/4 mile to light. Turn left onto West 52. From light, go about 0.9 mi into Liberty until the junction at 55 East. Turn on 55 East toward Grahamsville. Turn left onto County Road 19 to Claryville. Stay on 19 through Claryville. Take an immediate left just over the "10 TON" steel bridge at the edge of town. Follow the semi-paved road about 0.7 mi to fork. Take right fork. The first house on left (green) is the property where the site is. Follow mud road along the right side of the house about 3/4 mi.

Hazards: hunters

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: Leave site on Wildcat Mountain Road. Turn right onto Route 19. Follow 19 until you come to the intersection of 19 & 55. Turn right and proceed to Liberty. At the intersection of 55 & 52 you will see the signs for Community General Hospital. Follow signs to hospital entrance.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: None

Utility Phone: N/A

Telephone Company: Cellular One 001-0011262-4

TelCo Phone: (888) 910-9191

Comments: Police: (845) 292-6600; Fire/Ambulance (845) 292-4121; Medical Facility, Community General Hospital, Harris (Liberty), NY: (845) 794-3300.

CASTNet Site Contact List

Site Number:	**181 (EGB181)**	Site Name: **Egbert, ON**	Updated: **9/18/2001**

Shelter Telephone: **(705) 458-3309**

Directions to Site: From Toronto, Canada take 403 to 401. Pick up 400 North toward Berre. Take the Highway 89 exit to Cookstown. Turn left, West to Cookstown. Turn right at light (Hwy 27 North). Go North about 3 miles. Turn left on side road 10. See sign: EGBERT 3. Go 3.2 miles. Turn right on Concession 8. See gate on left. Center for Atmospheric Research. Park in a visitor spot and go inside main lab to check in. Get a cart to take equipment out to site behind lab.

Hazards: surrounding fields occasionally used by hunters in the fall

Emergency Contact: see comments

Emergency Phone: see comments

Emergency Directions to Medical Facility: From site drive west on SR10 to County Road 56. Drive south on Country Road 56 to Hwy 89. Drive west on Hwy 89 into Alliston (past BM High School) to Church Street. Drive north on Church Street (past beer store, over bridge). Turn north onto Fletcher Crescent. Hospital is on right. ETA from site approx 15 minutes.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

Electric Utility: Provided by Centre for Atmospheric Research Experiments

Utility Phone: N/A

Telephone Company: Provided by Centre for Atmospheric Research Experiments

TelCo Phone: N/A

Comments: Police: (800) 461-4455; Fire: 722-3112; Ambulance: 435-4311; Closest Medical Facility (705) 435-6281, Stevenson Memorial Hospital, 200 Fletcher Crescent, Alliston, Ontario.

CASTNet Site Contact List

Site Number:	206	(ROM206)	Site Name: **Rocky Mtn NP, CO**	Updated: **9/28/2001**

Shelter Telephone: **(970) 586-2598**

Directions to Site: From the east side of Estes Park, take highway 7 south about 8.5 miles. Turn right on the first dirt road past "Longs Peak Inn." There is a sign that reads "High Peak Camp." The site is about 100 meters down the dirt road on the left, and 100 meters from the dirt road.

Hazards: N/A

Emergency Contact: Estes Park Medical Center

Emergency Phone: (970) 586-2317,911

Emergency Directions to Medical Facility: From the site take the dirt road east to highway 7. Turn left (north) on highway 7 to Estes Park. When approaching town, just before the junction of Hwy 7 and route 36, turn left on Stanley Avenue. Follow the blue Hospital signs about 0.5 miles to Estes Park Hospital.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: T54745820

Electric Utility: Provided by NPS

Utility Phone: N/A

Telephone Company: Qwest

TelCo Phone: (800) 344-1111

Comments:

CASTNet Site Contact List

Site Number:	**303 (CLD303)**	Site Name: **Clingmans Dome MADPro, TN**	Updated: **10/29/2001**

Shelter Telephone: **(865) 805-1864**

Directions to Site: Take Hwy 441 (from either Cherokee or Gatlinburg) to Ridgeline at Newfound Gap. Take road to Clingman's Dome. At Clingman's visitor parking lot go up 1/2 mile. Take footpath under spiral tower through woods approx 50m to site. 60m SW of spiral.

Hazards: N/A

Emergency Contact: Fort Sanders Sevier Medical Center

Emergency Phone: (865) 429-6100

Emergency Directions to Medical Facility: See map. Take highway 441 north to Sevierville. At left turn, continue straight to T road. Turn right on 411 E and go one mile to Middle Creek Road. Turn right on Middle Creek road and go one mile to Fort Sanders Hospital on the right.

In Cases of Emergency, please notify Harding ESE Air Resources Division as soon as possible: (352) 332-3318

UPS Account Number: N/A

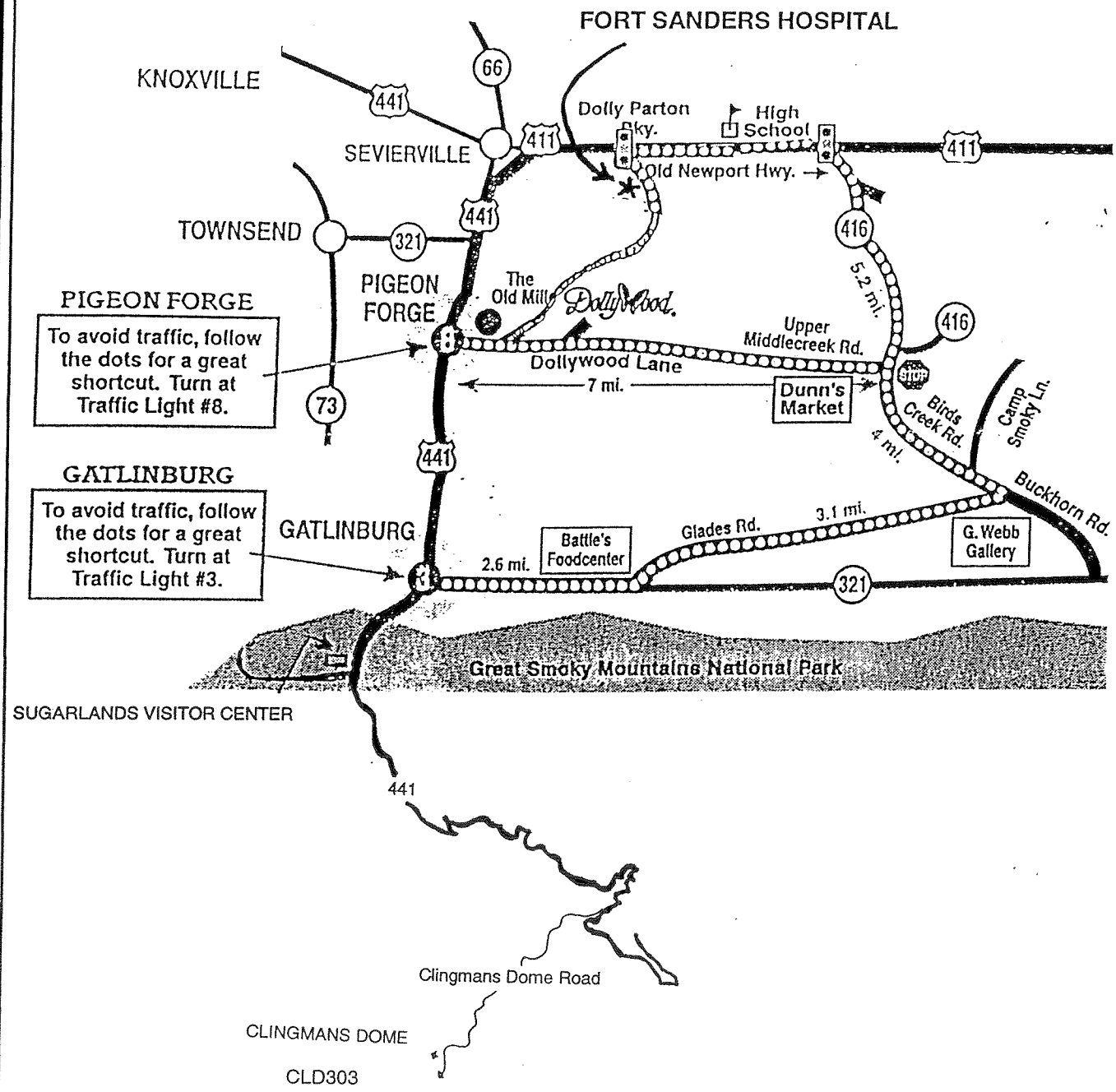
Electric Utility:

Utility Phone:

Telephone Company:

TelCo Phone:

Comments:



NEAREST MEDICAL FACILITY TO SITE 303

U.S.
Environmental Protection Agency

Clean Air Status and Trends Network

Appendix C

OSHA Regulations
(Standards – 29 CFR)

The control of hazardous energy (lockout/tagout). – 1910.147

The control of hazardous energy (lockout/tagout). – 1910.147

- **Part Number:** 1910
- **Part Title:** Occupational Safety and Health Standards
- **Subpart:** J
- **Subpart Title:** General Environmental Controls
- **Standard Number:** 1910.147
- **Title:** The control of hazardous energy (lockout/tagout).

- **Appendix:** A

1910.147(a)

Scope, application and purpose -

1910.147(a)(1)

Scope

1910.147(a)(1)(i)

This standard covers the servicing and maintenance of machines and equipment in which the **unexpected** energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

1910.147(a)(1)(ii)

This standard does not cover the following:

1910.147(a)(1)(ii)(A)

Construction, agriculture and maritime employment;

1910.147(a)(1)(ii)(B)

Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution, including related equipment for communication or metering; and

1910.147(a)(1)(ii)(C)

Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part; and

..1910.147(a)(1)(ii)(D)

1910.147(a)(1)(ii)(D)

Oil and gas well drilling and servicing.

1910.147(a)(2)

Application.

1910.147(a)(2)(i)

This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.

1910.147(a)(2)(ii)

Normal production operations are not covered by this standard (See Subpart O of this Part). Servicing and/or maintenance which takes place during normal production operations is

covered by this standard only if:

1910.147(a)(2)(ii)(A)

An employee is required to remove or bypass a guard or other safety device; or

1910.147(a)(2)(ii)(B)

An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

Note: **Exception to paragraph (a)(2)(ii):** Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of this Part).

1910.147(a)(2)(iii)

This standard does not apply to the following:

..1910.147(a)(2)(iii)(A)

1910.147(a)(2)(iii)(A)

Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

1910.147(a)(2)(iii)(B)

Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that the employer demonstrates that-

1910.147(a)(2)(iii)(B)(1)

continuity of service is essential;

1910.147(a)(2)(iii)(B)(2)

shutdown of the system is impractical; and

1910.147(a)(2)(iii)(B)(3)

documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

1910.147(a)(3)

Purpose.

1910.147(a)(3)(i)

This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

1910.147(a)(3)(ii)

When other standards in this part require the use of lockout or tagout, they shall be used and

supplemented by the procedural and training requirements of this section.

1910.147(b)

Definitions applicable to this section.

Affected employee. An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee. A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Capable of being locked out. An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized. Connected to an energy source or containing residual or stored energy.

Energy isolating device. A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source. Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot tap. A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. it is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout. The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device. A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal production operations. The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance. Workplace activities such as constructing, installing, setting

up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Setting up. Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout. The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device. A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

..1910.147(c)

1910.147(c)

General -

1910.147(c)(1)

Energy control program. The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

1910.147(c)(2)

Lockout/tagout.

1910.147(c)(2)(i)

If an energy isolating device is not capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize a tagout system.

1910.147(c)(2)(ii)

If an energy isolating device is capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize lockout, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection as set forth in paragraph (c)(3) of this section.

1910.147(c)(2)(iii)

After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

1910.147(c)(3)

Full employee protection.

1910.147(c)(3)(i)

When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would

have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

..1910.147(c)(3)(ii)

1910.147(c)(3)(ii)

In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of this standard together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

1910.147(c)(4)

Energy control procedure.

1910.147(c)(4)(i)

Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: **Exception:** The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: (1) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees; (2) the machine or equipment has a single energy source which can be readily identified and isolated; (3) the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment; (4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; (5) a single lockout device will achieve a locker-out condition; (6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

1910.147(c)(4)(ii)

The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

1910.147(c)(4)(ii)(A)

A specific statement of the intended use of the procedure;

1910.147(c)(4)(ii)(B)

Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;

1910.147(c)(4)(ii)(C)

Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and

..1910.147(c)(4)(ii)(D)

1910.147(c)(4)(ii)(D)

Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

1910.147(c)(5)

Protective materials and hardware.

1910.147(c)(5)(i)

Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

1910.147(c)(5)(ii)

Lockout devices and tagout devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:

1910.147(c)(5)(ii)(A)

Durable.

1910.147(c)(5)(ii)(A)(1)

Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

1910.147(c)(5)(ii)(A)(2)

Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

1910.147(c)(5)(ii)(A)(3)

Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

..1910.147(c)(5)(ii)(B)

1910.147(c)(5)(ii)(B)

Standardized. Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: Color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized.

1910.147(c)(5)(ii)(C)

Substantial -

1910.147(c)(5)(ii)(C)(1)

Lockout devices. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

1910.147(c)(5)(ii)(C)(2)

Tagout devices. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a

minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

1910.147(c)(5)(ii)(D)

Identifiable. Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).

1910.147(c)(5)(iii)

Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: **Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.**

..1910.147(c)(6)

1910.147(c)(6)

Periodic inspection.

1910.147(c)(6)(i)

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

1910.147(c)(6)(i)(A)

The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.

1910.147(c)(6)(i)(B)

The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

1910.147(c)(6)(i)(C)

Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

1910.147(c)(6)(i)(D)

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in paragraph (c)(7)(ii) of this section.

..1910.147(c)(6)(ii)

1910.147(c)(6)(ii)

The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

1910.147(c)(7)

Training and communication.

1910.147(c)(7)(i)

The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include the following:

1910.147(c)(7)(i)(A)

Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

1910.147(c)(7)(i)(B)

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

1910.147(c)(7)(i)(C)

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

1910.147(c)(7)(ii)

When tagout systems are used, employees shall also be trained in the following limitations of tags:

..1910.147(c)(7)(ii)(A)

1910.147(c)(7)(ii)(A)

Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

1910.147(c)(7)(ii)(B)

When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

1910.147(c)(7)(ii)(C)

Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

1910.147(c)(7)(ii)(D)

Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

1910.147(c)(7)(ii)(E)

Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

1910.147(c)(7)(ii)(F)

Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

1910.147(c)(7)(iii)

Employee retraining.

..1910.147(c)(7)(iii)(A)

1910.147(c)(7)(iii)(A)

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

1910.147(c)(7)(iii)(B)

Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

1910.147(c)(7)(iii)(C)

The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

1910.147(c)(7)(iv)

The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

1910.147(c)(8)

Energy isolation. Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

1910.147(c)(9)

Notification of employees. Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

..1910.147(d)

1910.147(d)

Application of control. The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

1910.147(d)(1)

Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

1910.147(d)(2)

Machine or equipment shutdown. The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

1910.147(d)(3)

Machine or equipment isolation. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a

manner as to isolate the machine or equipment from the energy source(s).

1910.147(d)(4)

Lockout or tagout device application.

1910.147(d)(4)(i)

Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

..1910.147(d)(4)(ii)

1910.147(d)(4)(ii)

Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

1910.147(d)(4)(iii)

Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

1910.147(d)(4)(iii)(A)

Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

1910.147(d)(4)(iii)(B)

Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

1910.147(d)(5)

Stored energy.

1910.147(d)(5)(i)

Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

..1910.147(d)(5)(ii)

1910.147(d)(5)(ii)

If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

1910.147(d)(6)

Verification of isolation. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

1910.147(e)

Release from lockout or tagout. Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

1910.147(e)(1)

The machine or equipment. The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

1910.147(e)(2)

Employees.

1910.147(e)(2)(i)

The work area shall be checked to ensure that all employees have been safely positioned or removed.

1910.147(e)(2)(ii)

After lockout or tagout devices have been removed and before a machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

1910.147(e)(3)

Lockout or tagout devices removal. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. **Exception to paragraph (e)(3):** When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

1910.147(e)(3)(i)

Verification by the employer that the authorized employee who applied the device is not at the facility:

1910.147(e)(3)(ii)

Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

1910.147(e)(3)(iii)

Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

..1910.147(f)

1910.147(f)

Additional requirements.

1910.147(f)(1)

Testing or positioning of machines, equipment or components thereof. In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

1910.147(f)(1)(i)

Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of

this section;

1910.147(f)(1)(ii)

Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;

1910.147(f)(1)(iii)

Remove the lockout or tagout devices as specified in paragraph (e)(3) of this section;

1910.147(f)(1)(iv)

Energize and proceed with testing or positioning;

1910.147(f)(1)(v)

Deenergize all systems and reapply energy control measures in accordance with paragraph (d) of this section to continue the servicing and/or maintenance.

1910.147(f)(2)

Outside personnel (contractors, etc.).

1910.147(f)(2)(i)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.

..1910.147(f)(2)(ii)

1910.147(f)(2)(ii)

The on-site employer shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

1910.147(f)(3)

Group lockout or tagout.

1910.147(f)(3)(i)

When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

1910.147(f)(3)(ii)

Group lockout or tagout devices shall be used in accordance with the procedures required by paragraph (c)(4) of this section including, but not necessarily limited to, the following specific requirements:

1910.147(f)(3)(ii)(A)

Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock);

1910.147(f)(3)(ii)(B)

Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and

1910.147(f)(3)(ii)(C)

When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to

coordinate affected work forces and ensure continuity of protection; and

..1910.147(f)(3)(ii)(D)

1910.147(f)(3)(ii)(D)

Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

1910.147(f)(4)

Shift or personnel changes. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

Note: The following appendix to §1910.147 services as a non-mandatory guideline to assist employers and employees in complying with the requirements of this section, as well as to provide other helpful information. Nothing in the appendix adds to or detracts from any of the requirements of this section.

[54 FR 36687, Sept. 1, 1989, as amended at 54 FR 42498, Oct. 17, 1989; 55 FR 38685, 38686, Sept. 20, 1990; 61 FR 5507, Feb. 13, 1996]

Appendix D

OSHA Regulations
(Standards – 29 CFR)

Personal Fall Arrest System – 1910.66 App. C

Personal Fall Arrest System – 1910.66 App. C

OSHA -- Occupational Safety & Health Administration
U.S. Department of Labor

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Regulations (Standards - 29 CFR)
Personal Fall Arrest System (Section I - Mandatory; Sections II and III - Non-Mandatory) - 1910.66 App C

Regulations (Standards - 29 CFR) - Table of Contents

• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	F
• Subpart Title:	Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms
• Standard Number:	1910.66 App C
• Title:	Personal Fall Arrest System (Section I - Mandatory; Sections II and III - Non-Mandatory)

Use of the Appendix

Section I of appendix C sets out the mandatory criteria for personal fall arrest systems used by all employees using powered platforms, as required by paragraph (j)(1) of this standard. Section II sets out nonmandatory test procedures which may be used to determine compliance with applicable requirements contained in section I of this appendix. Section III provides nonmandatory guidelines which are intended to assist employers in complying with these provisions.

I. "Personal fall arrest systems" - (a) "Scope and application." This section establishes the application of and performance criteria for personal fall arrest systems which are required for use by all employees using powered platforms under paragraph 1910.66(j).

(b) "Definitions."

"Anchorage" means a secure point of attachment for lifelines, lanyards or deceleration devices, and which is independent of the means of supporting or suspending the employee.

"Body belt" means a strap with means both for securing it about the waist and for attaching it to a lanyard. lifeline, or deceleration device.

"Body harness" means a design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis. waist, chest and shoulders with means for attaching it,to other components of a personal fall arrest system.

"Buckle" means any device for holding the body belt or body harness closed around the

employee's body.

"Competent person" means a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment.

"Connector" means a device which is used to couple (connect) parts of the system together. It may be an independent component of the system (such as a carabiner), or an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

"Deceleration device" means any mechanism, such as a rope grab, ripstitch lanyard, specially woven lanyard, tearing or deforming lanyard, or automatic self retracting-lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

"Deceleration distance" means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

"Equivalent" means alternative designs materials or methods which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

"Free fall" means the act of falling before the personal fall arrest system begins to apply force to arrest the fall.

"Free fall distance" means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, lifeline and lanyard elongation but include any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

"Lanyard" means a flexible line of rope, wire rope, or strap which is used to secure the body belt or body harness to a deceleration device, lifeline, or anchorage.

"Lifeline" means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

"Personal fall arrest system" means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

"Qualified person" means one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.

"Rope grab" means a deceleration device which travels on a lifeline and automatically frictionally engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/lever locking, or both.

"Self-retracting lifeline/lanyard" means a deceleration device which contains a drum wound line which may be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

"Snap-hook" means a connector comprised of a hookshaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap-hooks are generally one of two types:

1. The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection, or

2. The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection.

"Tie-off' means the act of an employee, wearing personal fall protection equipment, connecting directly or indirectly to an anchorage. It also means the condition of an employee being connected to an anchorage.

(c) Design for system components. (1) Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

(2) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

(3) Lanyards and vertical lifelines which tie-off one employee shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

(4) Self-retracting lifelines and lanyards which automatically limit free fall distance to two feet (0.61 m) or less shall have components capable of sustaining a minimum static tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.

(5) Self-retracting lifelines and lanyards which do not limit free fall distance to two feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

(6) Dee-rings and snap-hooks shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN).

(7) Dee-rings and snap-hooks shall be 100 percent proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

(8) Snap-hooks shall be sized to be compatible with the member to which they are connected so as to prevent unintentional disengagement of the snap-hook by depression of the snap-hook keeper by the connected member, or shall be a locking type snap-hook designed and

used to prevent disengagement of the snap-hook by the contact of the snaphook keeper by the connected member.

(9) Horizontal lifelines, where used, shall be designed, and installed as part of a complete personal fall arrest system, which maintains a safety factor of at least two, under the supervision of a qualified person.

(10) Anchorages to which personal fall arrest equipment is attached shall be capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as part of a complete personal fall arrest system which maintains a safety factor of at least two, under the supervision of a qualified person.

(11) Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses, shall be made from synthetic fibers or wire rope.

(d) "System performance criteria." (1) Personal fall arrest systems shall, when stopping a fall:

(i) Limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;

(ii) Limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;

(iii) Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and

(iv) Shall have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of six feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

(2)(i) When used by employees having a combined person and tool weight of less than 310 pounds (140 kg), personal fall arrest systems which meet the criteria and protocols contained in paragraphs (b), (c) and (d) in section II of this appendix shall be considered as complying with the provisions of paragraphs (d)(1)(i) through (d)(1)(iv) above.

(ii) When used by employees having a combined tool and body weight of 310 pounds (140 kg) or more, personal fall arrest systems which meet the criteria and protocols contained in paragraphs (b), (c) and (d) in section II may be considered as complying with the provisions of paragraphs (d)(1)(i) through (d)(1)(iv) provided that the criteria and protocols are modified appropriately to provide proper protection for such heavier weights.

(e) "Care and use." (1) Snap-hooks, unless of a locking type designed and used to prevent disengagement from the following connections, shall not be engaged:

(i) Directly to webbing, rope or wire rope;

(ii) To each other;

(iii) To a dee-ring to which another snap-hook or other connector is attached;

(iv) To a horizontal lifeline; or

(v) To any object which is incompatibly shaped or dimensioned in relation to the snap-hook

such that the connected object could depress the snap-hook keeper a sufficient amount to release itself.

(2) Devices used to connect to a horizontal lifeline which may become a vertical lifeline shall be capable of locking in either direction on the lifeline.

(3) Personal fall arrest systems shall be rigged such that an employee can neither free fall more than six feet (1.8 m), nor contact any lower level.

(4) The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

(5) When vertical lifelines are used, each employee shall be provided with a separate lifeline.

(6) Personal fall arrest systems or components shall be used only for employee fall protection.

(7) Personal fall arrest systems or components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.

(8) The employer shall provide for prompt rescue of employees in the event of a fall or shall assure the self-rescue capability of employees.

(9) Before using a personal fall arrest system and after any component or system is changed, employees shall be trained in accordance with the requirements of paragraph 1910.66(i)(1), in the safe use of the system.

(f) "Inspections." Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage and other deterioration, and defective components shall be removed from service if their strength or function may be adversely affected.

II. "Test methods for personal fall arrest systems (non-mandatory)" - (a) "General." Paragraphs (b), (c), (d) and (e), of this section II set forth test procedures which may be used to determine compliance with the requirements in paragraph (d)(1)(i) through (d)(1)(iv) of section I of this appendix.

(b) "General conditions for all tests in section II." (1) Lifelines, lanyards and deceleration devices should be attached to an anchorage and connected to the body-belt or body harness in the same manner as they would be when used to protect employees.

(2) The anchorage should be rigid, and should not have a deflection greater than .04 inches (1 mm) when a force of 2,250 pounds (10 kN) is applied.

(3) The frequency response of the load measuring instrumentation should be 120 Hz.

(4) The test weight used in the strength and force tests should be a rigid, metal, cylindrical or torso-shaped object with a girth of 38 inches plus or minus four inches (96 cm plus or minus 10 cm).

(5) The lanyard or lifeline used to create the free fall distance should be supplied with the

system, or in its absence, the least elastic lanyard or lifeline available to be used with the system.

(6) The test weight for each test should be hoisted to the required level and should be quickly released without having any appreciable motion imparted to it.

(7) The system's performance should be evaluated taking into account the range of environmental conditions for which it is designed to be used.

(8) Following the test, the system need not be capable of further operation.

(c) "Strength test." (1) During the testing of all systems a test weight of 300 pounds plus or minus five pounds (135 kg plus or minus 2.5 kg) should be used. (See paragraph (b)(4), above.)

(2) The test consists of dropping the test weight once. A new unused system should be used for each test.

(3) For lanyard systems, the lanyard length should be six feet plus or minus two inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body belt or body harness.

(4) For rope-grab-type deceleration systems, the length of the lifeline above the centerline of the grabbing mechanism to the lifeline's anchorage point should not exceed two feet (0.61 m).

(5) For lanyard systems, for systems with deceleration devices which do not automatically limit free fall distance to two feet (0.61 m) or less, and for systems with deceleration devices which have a connection distance in excess of one foot (0.3 m) (measured between the centerline of the lifeline and the attachment point to the body belt or harness), the test weight should be rigged to free fall a distance of 7.5 feet (2.3 m) from a point that is 1.5 feet (46 cm) above the anchorage point, to its hanging location (six feet below the anchorage). The test weight should fall without interference, obstruction, or hitting the floor or ground during the test. In some cases a non-elastic wire lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

(6) For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to two feet (0.61 m) or less, the test weight should be rigged to free fall a distance of four feet (1.22 m).

(7) Any weight which detaches from the belt or harness should constitute failure for the strength test.

(d) "Force test" - (1) "General." The test consists of dropping the respective test weight specified in (d)(2)(i) or (d)(3)(i) once. A new, unused system should be used for each test.

(2) "For lanyard systems." (i) A test weight of 220 pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used. (See paragraph (b)(4), above.)

(ii) Lanyard length should be six feet plus or minus two inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body belt or body harness.

(iii) The test weight should fall free from the anchorage level to its hanging location (a total

of six feet (1.83 m) free fall distance) without interference, obstruction, or hitting the floor or ground during the test.

(3) "For all other systems." (i) A test weight of 220 pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used. (See paragraph (b)(4), above.)

(ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of six feet (1.83 m), except as follows:

(A) For deceleration systems which have a connection link or lanyard, the test weight should free fall a distance equal to the connection distance (measured between the centerline of the lifeline and the attachment point to the body belt or harness).

(B) For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to two feet (0.61 m) or less, the test weight should free fall a distance equal to that permitted by the system in normal use. (For example, to test a system with a self-retracting lifeline or lanyard, the test weight should be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured).

(4) A system fails the force test if the recorded maximum arresting force exceeds 1,260 pounds (15.6 kN) when using a body belt, and/or exceeds 2,520 pounds (11.2 kN) when using a body harness.

(5) The maximum elongation and deceleration distance should be recorded during the force test.

(e) "Deceleration device tests" - (1) "General." The device should be evaluated or tested under the environmental conditions. (such as rain, ice, grease, dirt, type of lifeline, etc.), for which the device is designed.

(2) "Rope-grab-type deceleration devices." (i) Devices should be moved on a lifeline 1,000 times over the same length of line a distance of not less than one foot (30.5 cm), and the mechanism should lock each time.

(ii) Unless the device is permanently marked to indicate the type(s) of lifeline which must be used, several types (different diameters and different materials), of lifelines should be used to test the device.

(3) "Other self-activating-type deceleration devices." The locking mechanisms of other self-activating-type deceleration devices designed for more than one arrest should lock each of 1,000 times as they would in normal service.

III. "Additional non-mandatory guidelines for personal full arrest systems." The following information constitutes additional guidelines for use in complying with requirements for a personal fall arrest system.

(a) "Selection and use considerations." The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to a minimum. Consideration should be given to the particular work environment. For example, the presence of acids, dirt, moisture, oil, grease, etc., and their effect on the system,

should be evaluated. Hot or cold environments may also have an adverse affect on the system. Wire rope should not be used where an electrical hazard is anticipated. As required by the standard, the employer must plan to have means available to promptly rescue an employee should a fall occur, since the suspended employee may not be able to reach a work level independently.

Where lanyards. connectors. and lifelines are subject to damage by work operations such as welding, chemical cleaning, and sandblasting, the component should be protected, or other securing systems should be used. The employer should fully evaluate the work conditions and environment (including seasonal weather changes) before selecting the appropriate personal fall protection system. Once in use, the system's effectiveness should be monitored. In some cases, a program for cleaning and maintenance of the system may be necessary.

(b) "Testing considerations." Before purchasing or putting into use a personal fall arrest system, an employer should obtain from the supplier information about the system based on its performance during testing so that the employer can know if the system meets this standard. Testing should be done using recognized test methods. Section II of this appendix C contains test methods recognized for evaluating the performance of fall arrest systems. Not all systems may need to be individually tested; the performance of some systems may be based on data and calculations derived from testing of similar systems, provided that enough information is available to demonstrate similarity of function and design.

(c) "Comment compatibility considerations." Ideally, a personal fall arrest system is designed, tested, and supplied as a complete system. However, it is common practice for lanyards, connectors, lifelines, deceleration devices, body belts and body harnesses to be interchanged since some components wear out before others. The employer and employee should realize that not all components are interchangeable. For instance, a lanyard should not be connected between a body belt (or harness) and a deceleration device of the self-retracting type since this can result in additional free fall for which the system was not designed. Any substitution or change to a personal fall arrest system should be fully evaluated or tested by a competent person to determine that it meets the standard, before the modified system is put in use.

(d) "Employee training considerations." Thorough employee training in the selection and use of personal fall arrest systems is imperative. As stated in the standard, before the equipment is used, employees must be trained in the safe use of the system. This should include the following: Application limits; proper anchoring and tie-off techniques; estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level; methods of use; and inspection and storage of the system. Careless or improper use of the equipment can result in serious injury or death. Employers and employees should become familiar with the material in this appendix, as well as manufacturer's recommendations, before a system is used. Of uppermost importance is the reduction in strength caused by certain tie-offs (such as using knots, tying around sharp edges, etc.) and maximum permitted free fall distance. Also, to be stressed are the importance of inspections prior to use, the limitations of the equipment, and unique conditions at the worksite which may be important in determining the type of system to use.

(e) "Instruction considerations." Employers should obtain comprehensive instructions from the supplier as to the system's proper use and application, including, where applicable:

(1) The force measured during the sample force test;

(2) The maximum elongation measured for lanyards during the force test;

(3) The deceleration distance measured for deceleration devices during the force test;

(4) Caution statements on critical use limitations;

(5) Application limits;

(6) Proper hook-op, anchoring and tie-off techniques, including the proper dee-ring or other attachment point to use on the body belt and harness for fall arrest;

(7) Proper climbing techniques;

(8) Methods of inspection, use, cleaning, and storage; and

(9) Specific lifelines which may be used. This information should be provided to employees during training.

(f) "Inspection considerations." As stated in the standard (section I, Paragraph (f)), personal fall arrest systems must be regularly inspected. Any component with any significant defect, such as cuts, tears, abrasions, mold, or undue stretching; alterations or additions which might affect its efficiency; damage due to deterioration; contact with fire, acids, or other corrosives; distorted hooks or faulty hook springs; tongues unfitted to the shoulder of buckles; loose or damaged mountings; non-functioning parts; or wearing or internal deterioration in the ropes must be withdrawn from service immediately, and should be tagged or marked as unusable, or destroyed.

(g) "Rescue considerations." As required by the standard (section I Paragraph (e)(8)), when personal fall arrest systems are used, the employer must assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders or other rescue equipment should be evaluated. In some situations, equipment which allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices which have descent capability.

(h) "Tie-off considerations." (1) One of the most important aspects of personal fall protection systems is fully planning the system "before" it is put into use. Probably the most overlooked component is planning for suitable anchorage points. Such planning should ideally be done before the structure or building is constructed so that anchorage points can be incorporated during construction for use later for window cleaning or other building maintenance. If properly planned, these anchorage points may be used "during" construction, as well as afterwards.

(2) Employers and employees should at all times be aware that the strength of a personal fall arrest system is based on its being attached to an anchoring system which does not significantly reduce the strength of the system (such as a properly dimensioned eye-bolt/snap-hook anchorage). Therefore, if a means of attachment is used that will reduce the strength of the system, that component should be replaced by a stronger one, but one that will also maintain the appropriate maximum arrest force characteristics.

(3) Tie-off using a knot in a rope lanyard or lifeline (at any location) can reduce the lifeline

or lanyard strength by 50 percent or more. Therefore, a stronger lanyard or lifeline should be used to compensate for the weakening effect of the knot, or the lanyard length should be reduced (or the tie-off location raised) to minimize free fall distance, or the lanyard or lifeline should be replaced by one which has an appropriately incorporated connector to eliminate the need for a knot.

(4) Tie-off of a rope lanyard or lifeline around an "H" or "I" beam or similar support can reduce its strength as much as 70 percent due to the cutting action of the beam edges. Therefore, use should be made of a webbing lanyard or wire core lifeline around the beam; or the lanyard or lifeline should be protected from the edge: or free fall distance should be greatly minimized.

(5) Tie-off where the line passes over or around rough or sharp surfaces reduces strength drastically. Such a tie-off should be avoided or an alternative tie-off rigging should be used. Such alternatives may include use of a snap-hook/dee ring connection, wire rope tie-off, an effective padding of the surfaces, or an abrasion-resistance strap around or over the problem surface.

(6) Horizontal lifelines may, depending on their geometry and angle of sag, be subjected to greater loads than the impact load imposed by an attached component. When the angle of horizontal lifeline sag is less than 30 degrees, the impact force imparted to the lifeline by an attached lanyard is greatly amplified. For example, with a sag angle of 15 degrees, the force amplification is about 2:1 and at 5 degrees sag, it is about 6:1. Depending on the angle of sag, and the line's elasticity, the strength of the horizontal lifeline and the anchorages to which it is attached should be increased a number of times over that of the lanyard. Extreme care should be taken in considering a horizontal lifeline for multiple tie-offs. The reason for this is that in multiple tie-offs to a horizontal lifeline, if one employee falls, the movement of the falling employee and the horizontal lifeline during arrest of the fall may cause other employees to also fall. Horizontal lifeline and anchorage strength should be increased for each additional employee to be tied-off. For these and other reasons, the design of systems using horizontal lifelines must only be done by qualified persons. Testing of installed lifelines and anchors prior to use is recommended.

(7) The strength of an eye-bolt is rated along the axis of the bolt and its strength is greatly reduced if the force is applied at an angle to this axis (in the direction of shear). Also, care should be exercised in selecting the proper diameter of the eye to avoid accidental disengagement of snap-hooks not designed to be compatible for the connection.

(8) Due to the significant reduction in the strength of the lifeline/lanyard (in some cases, as much as a 70 percent reduction), the sliding hitch knot should not be used for lifeline/lanyard connections except in emergency situations where no other available system is practical. The "one-and-one" sliding hitch knot should never be used because it is unreliable in stopping a fall. The "two-and-two," or "three-and-three" knot (preferable), may be used in emergency situations; however, care should be taken to limit free fall distance to a minimum because of reduced lifeline/lanyard strength.

(i) "Vertical lifeline considerations." As required by the standard, each employee must have a separate lifeline when the lifeline is vertical. The reason for this is that in multiple tie-offs to a single lifeline, if one employee falls, the movement of the lifeline during the arrest of the fall may pull other employees' lanyards, causing them to fall as well.

(j) "Snap-hook considerations." Although not required by this standard for all connections, locking snap-hooks designed for connection to suitable objects (of sufficient strength) are highly recommended in lieu of the non-locking type. Locking snap-hooks incorporate a positive locking mechanism in addition to the spring loaded keeper, which will not allow the keeper to open under moderate pressure without someone first releasing the mechanism. Such a feature, properly designed, effectively prevents roll-out from occurring.

As required by the standard (section I, paragraph (e)(1)) the following connections must be avoided (unless properly designed locking snap-hooks are used) because they are conditions which can result in roll-out when a nonlocking snap-hook is used:

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 . Direct connection of a snap-hook to horizontal lifeline.
 . Two (or more) snap-hooks connected to one dee-ring.
 . Two snap-hooks connected to each other.
 . A snap-hook connected back on its integral lanyard.
 . A snap-hook connected to a webbing loop or webbing lanyard.
 . Improper dimensions of the dee-ring, rebar, or other connection
point in relation to the snap-hook dimensions which would allow the
snap-hook keeper to be depressed by a turning motion of the
snap-hook.
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(k) "Free fall considerations." The employer and employee should at all times be aware that a system's maximum arresting force is evaluated under normal use conditions established by the manufacturer, and in no case using a free fall distance in excess of six feet (1.8 m). A few extra feet of free fall can significantly increase the arresting force on the employee, possibly to the point of causing injury. Because of this, the free fall distance should be kept at a minimum, and, as required by the standard, in no case greater than six feet (1-8 m). To help assure this, the tie-off attachment point to the lifeline or anchor should be located at or above the connection point of the fall arrest equipment to belt or harness. (Since otherwise additional free fall distance is added to the length of the connecting means (i.e. lanyard)). Attaching to the working surface will often result in a free fall greater than six feet (1.8 m). For instance, if a six foot (1.8 m) lanyard is used, the total free fall distance will be the distance from the working level to the body belt (or harness) attachment point plus the six feet (1.8 m) of lanyard length. Another important consideration is that the arresting force which the fall system must withstand also goes up with greater distances of free fall, possibly exceeding the strength of the system.

(l) "Elongation and deceleration distance considerations." Other factors involved in a proper tie-off are elongation and deceleration distance. During the arresting of a fall, a lanyard will experience a length of stretching or elongation, whereas activation of a deceleration device will result in a certain stopping distance. These distances should be available with the lanyard or device's instructions and must be added to the free fall distance to arrive at the total fall distance before an employee is fully stopped. The additional stopping distance may be very significant if the lanyard or deceleration device is attached near or at the end of a long lifeline, which may itself add considerable distance due to its own elongation. As required by the standard, sufficient distance to allow for all of these factors must also be maintained between the employee and obstructions below, to prevent an injury due to impact before the system fully arrests the fall. In addition, a minimum of 12 feet (3.7 m) of lifeline should be allowed below the securing point of a rope grab type deceleration device, and the end terminated to prevent the device from sliding off the lifeline. Alternatively, the lifeline should extend to the ground or the next working level below. These measures are suggested to prevent the worker from inadvertently moving past the end of the lifeline and having the

rope grab become disengaged from the lifeline.

(m) "Obstruction considerations." The location of the tie-off should also consider the hazard of obstructions in the potential fall path of the employee. Tie-offs which minimize the possibilities of exaggerated swinging should be considered. In addition, when a body belt is used, the employee's body will go through a horizontal position to a jack-knifed position during the arrest of all falls. Thus, obstructions which might interfere with this motion should be avoided or a severe injury could occur.

(n) "Other considerations." Because of the design of some personal fall arrest systems, additional considerations may be required for proper tie-off. For example, heavy deceleration devices of the self-retracting type should be secured overhead in order to avoid the weight of the device having to be supported by the employee. Also, if self-retracting equipment is connected to a horizontal lifeline, the sag in the lifeline should be minimized to prevent the device from sliding down the lifeline to a position which creates a swing hazard during fall arrest. In all cases, manufacturer's instructions should be followed.

Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

Appendix E

OSHA Regulations
(Standards – 29 CFR)

Hazard Communication. – 1910.1200

Hazard Communication. – 1910.1200

OSHA -- Occupational Safety & Health Administration
U.S. Department of Labor

[Display the graphic version of this page]

Regulations (Standards - 29 CFR)
Hazard Communication. - 1910.1200

Regulations (Standards - 29 CFR) - Table of Contents

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• Appendix:	A , B , C , D , E

1910.1200(a)

"Purpose."

1910.1200(a)(1)

The purpose of this section is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

..1910.1200(a)(2)

1910.1200(a)(2)

This occupational safety and health standard is intended to address comprehensively the issue of evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, and to preempt any legal requirements of a state, or political subdivision of a state, pertaining to this subject. Evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, may include, for example, but is not limited to, provisions for: developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present; labeling of containers of chemicals in the workplace, as well as of containers of chemicals being shipped to other workplaces; preparation and distribution of material safety data sheets to employees and downstream employers; and development and implementation of employee training programs regarding hazards of chemicals and protective measures. Under section 18 of the

Act, no state or political subdivision of a state may adopt or enforce, through any court or agency, any requirement relating to the issue addressed by this Federal standard, except pursuant to a Federally-approved state plan.

1910.1200(b)

"Scope and application."

1910.1200(b)(1)

This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers. (Employers who do not produce or import chemicals need only focus on those parts of this rule that deal with establishing a workplace program and communicating information to their workers. Appendix E of this section is a general guide for such employers to help them determine their compliance obligations under the rule.)

1910.1200(b)(2)

This section applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

1910.1200(b)(3)

This section applies to laboratories only as follows:

1910.1200(b)(3)(i)

Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

..1910.1200(b)(3)(ii)

1910.1200(b)(3)(ii)

Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible during each workshift to laboratory employees when they are in their work areas;

1910.1200(b)(3)(iii)

Employers shall ensure that laboratory employees are provided information and training in accordance with paragraph (h) of this section, except for the location and availability of the written hazard communication program under paragraph (h)(2)(iii) of this section; and,

1910.1200(b)(3)(iv)

Laboratory employers that ship hazardous chemicals are considered to be either a chemical manufacturer or a distributor under this rule, and thus must ensure that any containers of

hazardous chemicals leaving the laboratory are labeled in accordance with paragraph (f)(1) of this section, and that a material safety data sheet is provided to distributors and other employers in accordance with paragraphs (g)(6) and (g)(7) of this section.

1910.1200(b)(4)

In work operations where employees only handle chemicals in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or retail sales), this section applies to these operations only as follows:

1910.1200(b)(4)(i)

Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

..1910.1200(b)(4)(ii)

1910.1200(b)(4)(ii)

Employers shall maintain copies of any material safety data sheets that are received with incoming shipments of the sealed containers of hazardous chemicals, shall obtain a material safety data sheet as soon as possible for sealed containers of hazardous chemicals received without a material safety data sheet if an employee requests the material safety data sheet, and shall ensure that the material safety data sheets are readily accessible during each work shift to employees when they are in their work area(s); and,

1910.1200(b)(4)(iii)

Employers shall ensure that employees are provided with information and training in accordance with paragraph (h) of this section (except for the location and availability of the written hazard communication program under paragraph (h)(2)(iii) of this section), to the extent necessary to protect them in the event of a spill or leak of a hazardous chemical from a sealed container.

1910.1200(b)(5)

This section does not require labeling of the following chemicals:

1910.1200(b)(5)(i)

Any pesticide as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;

1910.1200(b)(5)(ii)

Any chemical substance or mixture as such terms are defined in the Toxic Substances Control Act (15 U.S.C. 2601 et seq.), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;

..1910.1200(b)(5)(iii)

1910.1200(b)(5)(iii)

Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product, including materials intended for use as ingredients in such products (e.g. flavors and fragrances), as such terms are defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.) or the Virus-Serum-Toxin Act of 1913 (21 U.S.C. 151 et seq.), and regulations issued under those Acts, when they are subject to the labeling requirements under those Acts by either the Food and Drug Administration or the Department of Agriculture;

1910.1200(b)(5)(iv)

Any distilled spirits (beverage alcohols), wine, or malt beverage intended for nonindustrial use, as such terms are defined in the Federal Alcohol Administration Act (27 U.S.C. 201 et seq.) and regulations issued under that Act, when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Bureau of Alcohol, Tobacco, and Firearms;

1910.1200(b)(5)(v)

Any consumer product or hazardous substance as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, when subject to a consumer product safety standard or labeling requirement of those Acts, or regulations issued under those Acts by the Consumer Product Safety Commission; and,

1910.1200(b)(5)(vi)

Agricultural or vegetable seed treated with pesticides and labeled in accordance with the Federal Seed Act (7 U.S.C. 1551 et seq.) and the labeling regulations issued under that Act by the Department of Agriculture.

..1910.1200(b)(6)

1910.1200(b)(6)

This section does not apply to:

1910.1200(b)(6)(i)

Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 et seq.), when subject to regulations issued under that Act by the Environmental Protection Agency;

1910.1200(b)(6)(ii)

Any hazardous substance as such term is defined by the Comprehensive Environmental Response, Compensation and Liability ACT (CERCLA) (42 U.S.C. 9601 et seq.) when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with the Environmental Protection Agency regulations.

1910.1200(b)(6)(iii)

Tobacco or tobacco products;

1910.1200(b)(6)(iv)

Wood or wood products, including lumber which will not be processed, where the chemical manufacturer or importer can establish that the only hazard they pose to employees is the potential for flammability or combustibility (wood or wood products which have been treated with a hazardous chemical covered by this standard, and wood which may be subsequently sawed or cut, generating dust, are not exempted);

1910.1200(b)(6)(v)

Articles (as that term is defined in paragraph (c) of this section);

1910.1200(b)(6)(vi)

Food or alcoholic beverages which are sold, used, or prepared in a retail establishment (such as a grocery store, restaurant, or drinking place), and foods intended for personal consumption by employees while in the workplace;

..1910.1200(b)(6)(vii)

1910.1200(b)(6)(vii)

Any drug, as that term is defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.), when it is in solid, final form for direct administration to the patient (e.g., tablets or pills); drugs which are packaged by the chemical manufacturer for sale to consumers in a retail establishment (e.g., over-the-counter drugs); and drugs intended for personal consumption by employees while in the workplace (e.g., first aid supplies);

1910.1200(b)(6)(viii)

Cosmetics which are packaged for sale to consumers in a retail establishment, and cosmetics intended for personal consumption by employees while in the workplace;

1910.1200(b)(6)(ix)

Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended;

1910.1200(b)(6)(x)

Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard covered under this section;

1910.1200(b)(6)(xi)

Ionizing and nonionizing radiation; and,

1910.1200(b)(6)(xii)

Biological hazards.

1910.1200(c)

"Definitions."

"Article" means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

"Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

"Chemical" means any element, chemical compound or mixture of elements and/or compounds.

"Chemical manufacturer" means an employer with a workplace where chemical(s) are produced for use or distribution.

"Chemical name" means the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.

"Combustible liquid" means any liquid having a flashpoint at or above 100 deg. F (37.8 deg. C), but below 200 deg. F (93.3 deg. C), except any mixture having components with flashpoints of 200 deg. F (93.3 deg. C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

"Commercial account" means an arrangement whereby a retail distributor sells hazardous chemicals to an employer, generally in large quantities over time and/or at costs that are below the regular retail price.

"Common name" means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

"Compressed gas" means:

(i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg. F (21.1 deg. C); or

(ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg. C); or

(iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by ASTM D-323-72.

"Container" means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or

piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

"Designated representative" means any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

"Director" means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

"Distributor" means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

"Employee" means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

"Employer" means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

"Explosive" means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

"Exposure or exposed" means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)

"Flammable" means a chemical that falls into one of the following categories:

(i) "Aerosol, flammable" means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

(ii) "Gas, flammable" means: (A) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or

(B) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit;

(iii) "Liquid, flammable" means any liquid having a flashpoint below 100 deg. F (37.8 deg. C), except any mixture having components with flashpoints of 100 deg. F (37.8 deg. C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

(iv) "Solid, flammable" means a solid, other than a blasting agent or explosive as defined in 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-

tenth of an inch per second along its major axis.

"Flashpoint" means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

(i) Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24-1979 (ASTM D 56-79)) for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 deg. F (37.8 deg. C), that do not contain suspended solids and do not have a tendency to form a surface film under test; or

(ii) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7-1979 (ASTM D 93-79)) for liquids with a viscosity equal to or greater than 45 SUS at 100 deg. F (37.8 deg. C), or that contain suspended solids, or that have a tendency to form a surface film under test; or

(iii) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78)).

Organic peroxides, which undergo autoaccelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

"Foreseeable emergency" means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

"Hazardous chemical" means any chemical which is a physical hazard or a health hazard.

"Hazard warning" means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s). (See the definitions for "physical hazard" and "health hazard" to determine the hazards which must be covered.)

"Health hazard" means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this standard.

"Identity" means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.

"Immediate use" means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

"Importer" means the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.

"Label" means any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

"Material safety data sheet (MSDS)" means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of this section.

"Mixture" means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

"Organic peroxide" means an organic compound that contains the bivalent -O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

"Oxidizer" means a chemical other than a blasting agent or explosive as defined in 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

"Physical hazard" means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

"Produce" means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.

"Pyrophoric" means a chemical that will ignite spontaneously in air at a temperature of 130 deg. F (54.4 deg. C) or below.

"Responsible party" means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

"Specific chemical identity" means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

"Trade secret" means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D sets out the criteria to be used in evaluating trade secrets.

"Unstable (reactive)" means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

"Use" means to package, handle, react, emit, extract, generate as a byproduct, or transfer.

"Water-reactive" means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

"Work area" means a room or defined space in a workplace where hazardous chemicals are

produced or used, and where employees are present.

"Workplace" means an establishment, job site, or project, at one geographical location containing one or more work areas.

..1910.1200(d)

1910.1200(d)

"Hazard determination."

1910.1200(d)(1)

Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to determine if they are hazardous. Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.

1910.1200(d)(2)

Chemical manufacturers, importers or employers evaluating chemicals shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section. Appendix A shall be consulted for the scope of health hazards covered, and Appendix B shall be consulted for the criteria to be followed with respect to the completeness of the evaluation, and the data to be reported.

1910.1200(d)(3)

The chemical manufacturer, importer or employer evaluating chemicals shall treat the following sources as establishing that the chemicals listed in them are hazardous:

1910.1200(d)(3)(i)

29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or,

..1910.1200(d)(3)(ii)

1910.1200(d)(3)(ii)

"Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment," American Conference of Governmental Industrial Hygienists (ACGIH) (latest edition). The chemical manufacturer, importer, or employer is still responsible for evaluating the hazards associated with the chemicals in these source lists in accordance with the requirements of this standard.

1910.1200(d)(4)

Chemical manufacturers, importers and employers evaluating chemicals shall treat the following sources as establishing that a chemical is a carcinogen or potential carcinogen for

hazard communication purposes:

1910.1200(d)(4)(i)

National Toxicology Program (NTP), "Annual Report on Carcinogens" (latest edition);

1910.1200(d)(4)(ii)

International Agency for Research on Cancer (IARC) "Monographs" (latest editions); or

1910.1200(d)(4)(iii)

29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

Note: The "Registry of Toxic Effects of Chemical Substances" published by the National Institute for Occupational Safety and Health indicates whether a chemical has been found by NTP or IARC to be a potential carcinogen.

1910.1200(d)(5)

The chemical manufacturer, importer or employer shall determine the hazards of mixtures of chemicals as follows:

1910.1200(d)(5)(i)

If a mixture has been tested as a whole to determine its hazards, the results of such testing shall be used to determine whether the mixture is hazardous;

..1910.1200(d)(5)(ii)

1910.1200(d)(5)(ii)

If a mixture has not been tested as a whole to determine whether the mixture is a health hazard, the mixture shall be assumed to present the same health hazards as do the components which comprise one percent (by weight or volume) or greater of the mixture, except that the mixture shall be assumed to present a carcinogenic hazard if it contains a component in concentrations of 0.1 percent or greater which is considered to be a carcinogen under paragraph (d)(4) of this section;

1910.1200(d)(5)(iii)

If a mixture has not been tested as a whole to determine whether the mixture is a physical hazard, the chemical manufacturer, importer, or employer may use whatever scientifically valid data is available to evaluate the physical hazard potential of the mixture; and,

1910.1200(d)(5)(iv)

If the chemical manufacturer, importer, or employer has evidence to indicate that a component present in the mixture in concentrations of less than one percent (or in the case of carcinogens, less than 0.1 percent) could be released in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health risk to employees in those concentrations, the mixture shall be assumed to present the same hazard.

1910.1200(d)(6)

Chemical manufacturers, importers, or employers evaluating chemicals shall describe in writing the procedures they use to determine the hazards of the chemical they evaluate. The written procedures are to be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director. The written description may be incorporated into the written hazard communication program required under paragraph (e) of this section.

..1910.1200(e)

1910.1200(e)

"Written hazard communication program."

1910.1200(e)(1)

Employers shall develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified in paragraphs (f), (g), and (h) of this section for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

1910.1200(e)(1)(i)

A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and,

1910.1200(e)(1)(ii)

The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

1910.1200(e)(2)

"Multi-employer workplaces." Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (e) include the following:

1910.1200(e)(2)(i)

The methods the employer will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working;

..1910.1200(e)(2)(ii)

1910.1200(e)(2)(ii)

The methods the employer will use to inform the other employer(s) of any precautionary

measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,

1910.1200(e)(2)(iii)

The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

1910.1200(e)(3)

The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).

1910.1200(e)(4)

The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.1020 (e).

1910.1200(e)(5)

Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the written hazard communication program may be kept at the primary workplace facility.

1910.1200(f)

"Labels and other forms of warning."

1910.1200(f)(1)

The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following information:

..1910.1200(f)(1)(i)

1910.1200(f)(1)(i)

Identity of the hazardous chemical(s);

1910.1200(f)(1)(ii)

Appropriate hazard warnings; and

1910.1200(f)(1)(iii)

Name and address of the chemical manufacturer, importer, or other responsible party.

1910.1200(f)(2)

1910.1200(f)(2)(i)

For solid metal (such as a steel beam or a metal casting), solid wood, or plastic items that are not exempted as articles due to their downstream use, or shipments of whole grain, the

required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes;

1910.1200(f)(2)(ii)

The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment; and,

1910.1200(f)(2)(iii)

This exception to requiring labels on every container of hazardous chemicals is only for the solid material itself, and does not apply to hazardous chemicals used in conjunction with, or known to be present with, the material and to which employees handling the items in transit may be exposed (for example, cutting fluids or pesticides in grains).

..1910.1200(f)(3)

1910.1200(f)(3)

Chemical manufacturers, importers, or distributors shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation.

1910.1200(f)(4)

If the hazardous chemical is regulated by OSHA in a substance-specific health standard, the chemical manufacturer, importer, distributor or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

1910.1200(f)(5)

Except as provided in paragraphs (f)(6) and (f)(7) of this section, the employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information:

1910.1200(f)(5)(i)

Identity of the hazardous chemical(s) contained therein; and,

1910.1200(f)(5)(ii)

Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

..1910.1200(f)(6)

1910.1200(f)(6)

The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by paragraph (f)(5) of this section to be on a label. The written materials shall be readily accessible to the employees in their work area throughout each work shift.

1910.1200(f)(7)

The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer. For purposes of this section, drugs which are dispensed by a pharmacy to a health care provider for direct administration to a patient are exempted from labeling.

1910.1200(f)(8)

The employer shall not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.

1910.1200(f)(9)

The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. Employers having employees who speak other languages may add the information in their language to the material presented, as long as the information is presented in English as well.

1910.1200(f)(10)

The chemical manufacturer, importer, distributor or employer need not affix new labels to comply with this section if existing labels already convey the required information.

..1910.1200(f)(11)

1910.1200(f)(11)

Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within three months of becoming aware of the new information. Labels on containers of hazardous chemicals shipped after that time shall contain the new information. If the chemical is not currently produced or imported, the chemical manufacturer, importers, distributor, or employer shall add the information to the label before the chemical is shipped or introduced into the workplace again.

1910.1200(g)

"Material safety data sheets."

1910.1200(g)(1)

Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data

sheet in the workplace for each hazardous chemical which they use.

1910.1200(g)(2)

Each material safety data sheet shall be in English (although the employer may maintain copies in other languages as well), and shall contain at least the following information:

1910.1200(g)(2)(i)

The identity used on the label, and, except as provided for in paragraph (i) of this section on trade secrets:

1910.1200(g)(2)(i)(A)

If the hazardous chemical is a single substance, its chemical and common name(s);

1910.1200(g)(2)(i)(B)

If the hazardous chemical is a mixture which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself; or,

1910.1200(g)(2)(i)(C)

If the hazardous chemical is a mixture which has not been tested as a whole:

..1910.1200(g)(2)(i)(C)(1)

1910.1200(g)(2)(i)(C)(1)

The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that chemicals identified as carcinogens under paragraph (d) of this section shall be listed if the concentrations are 0.1% or greater; and,

1910.1200(g)(2)(i)(C)(2)

The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health risk to employees; and,

1910.1200(g)(2)(i)(C)(3)

The chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture;

1910.1200(g)(2)(ii)

Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);

1910.1200(g)(2)(iii)

The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;

1910.1200(g)(2)(iv)

The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical;

1910.1200(g)(2)(v)

The primary route(s) of entry;

..1910.1200(g)(2)(vi)

1910.1200(g)(2)(vi)

The OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available;

1910.1200(g)(2)(vii)

Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA;

1910.1200(g)(2)(viii)

Any generally applicable precautions for safe handling and use which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;

1910.1200(g)(2)(ix)

Any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, such as appropriate engineering controls, work practices, or personal protective equipment;

1910.1200(g)(2)(x)

Emergency and first aid procedures;

1910.1200(g)(2)(xi)

The date of preparation of the material safety data sheet or the last change to it; and,

..1910.1200(g)(2)(xii)

1910.1200(g)(2)(xii)

The name, address and telephone number of the chemical manufacturer, importer, employer

or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

1910.1200(g)(3)

If no relevant information is found for any given category on the material safety data sheet, the chemical manufacturer, importer or employer preparing the material safety data sheet shall mark it to indicate that no applicable information was found.

1910.1200(g)(4)

Where complex mixtures have similar hazards and contents (i.e. the chemical ingredients are essentially the same, but the specific composition varies from mixture to mixture), the chemical manufacturer, importer or employer may prepare one material safety data sheet to apply to all of these similar mixtures.

1910.1200(g)(5)

The chemical manufacturer, importer or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in making the hazard determination. If the chemical manufacturer, importer or employer preparing the material safety data sheet becomes newly aware of any significant information regarding the hazards of a chemical, or ways to protect against the hazards, this new information shall be added to the material safety data sheet within three months. If the chemical is not currently being produced or imported the chemical manufacturer or importer shall add the information to the material safety data sheet before the chemical is introduced into the workplace again.

..1910.1200(g)(6)

1910.1200(g)(6)

1910.1200(g)(6)(i)

Chemical manufacturers or importers shall ensure that distributors and employers are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated;

1910.1200(g)(6)(ii)

The chemical manufacturer or importer shall either provide material safety data sheets with the shipped containers or send them to the distributor or employer prior to or at the time of the shipment;

1910.1200(g)(6)(iii)

If the material safety data sheet is not provided with a shipment that has been labeled as a hazardous chemical, the distributor or employer shall obtain one from the chemical manufacturer or importer as soon as possible; and,

1910.1200(g)(6)(iv)

The chemical manufacturer or importer shall also provide distributors or employers with a material safety data sheet upon request.

1910.1200(g)(7)

1910.1200(g)(7)(i)

Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers with their initial shipment and with the first shipment after a material safety data sheet is updated;

1910.1200(g)(7)(ii)

The distributor shall either provide material safety data sheets with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment;

..1910.1200(g)(7)(iii)

1910.1200(g)(7)(iii)

Retail distributors selling hazardous chemicals to employers having a commercial account shall provide a material safety data sheet to such employers upon request, and shall post a sign or otherwise inform them that a material safety data sheet is available;

1910.1200(g)(7)(iv)

Wholesale distributors selling hazardous chemicals to employers over-the-counter may also provide material safety data sheets upon the request of the employer at the time of the over-the-counter purchase, and shall post a sign or otherwise inform such employers that a material safety data sheet is available;

1910.1200(g)(7)(v)

If an employer without a commercial account purchases a hazardous chemical from a retail distributor not required to have material safety data sheets on file (i.e., the retail distributor does not have commercial accounts and does not use the materials), the retail distributor shall provide the employer, upon request, with the name, address, and telephone number of the chemical manufacturer, importer, or distributor from which a material safety data sheet can be obtained;

1910.1200(g)(7)(vi)

Wholesale distributors shall also provide material safety data sheets to employers or other distributors upon request; and,

1910.1200(g)(7)(vii)

Chemical manufacturers, importers, and distributors need not provide material safety data sheets to retail distributors that have informed them that the retail distributor does not sell the product to commercial accounts or open the sealed container to use it in their own workplaces.

..1910.1200(g)(8)

1910.1200(g)(8)

The employer shall maintain in the workplace copies of the required material safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s). (Electronic access, microfiche, and other alternatives to maintaining paper copies of the material safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.)

1910.1200(g)(9)

Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the material safety data sheets may be kept at the primary workplace facility. In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency.

1910.1200(g)(10)

Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in in their work area(s).

1910.1200(g)(11)

Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.1020(e). The Director shall also be given access to material safety data sheets in the same manner.

..1910.1200(h)

1910.1200(h)

"Employee information and training."

1910.1200(h)(1)

Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.

1910.1200(h)(2)

"Information." Employees shall be informed of:

1910.1200(h)(2)(i)

The requirements of this section;

1910.1200(h)(2)(ii)

Any operations in their work area where hazardous chemicals are present; and,

1910.1200(h)(2)(iii)

The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

1910.1200(h)(3)

"Training." Employee training shall include at least:

1910.1200(h)(3)(i)

Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

1910.1200(h)(3)(ii)

The physical and health hazards of the chemicals in the work area;

..1910.1200(h)(3)(iii)

1910.1200(h)(3)(iii)

The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and,

1910.1200(h)(3)(iv)

The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

1910.1200(i)

"Trade secrets."

1910.1200(i)(1)

The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that:

1910.1200(i)(1)(i)

The claim that the information withheld is a trade secret can be supported;

1910.1200(i)(1)(ii)

Information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed;

1910.1200(i)(1)(iii)

The material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret; and,

1910.1200(i)(1)(iv)

The specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph.

..1910.1200(i)(2)

1910.1200(i)(2)

Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The chemical manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of paragraphs (i)(3) and (4) of this section, as soon as circumstances permit.

1910.1200(i)(3)

In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld under paragraph (i)(1) of this section, to a health professional (i.e. physician, industrial hygienist, toxicologist, epidemiologist, or occupational health nurse) providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, if:

1910.1200(i)(3)(i)

The request is in writing;

1910.1200(i)(3)(ii)

The request describes with reasonable detail one or more of the following occupational health needs for the information:

1910.1200(i)(3)(ii)(A)

To assess the hazards of the chemicals to which employees will be exposed;

1910.1200(i)(3)(ii)(B)

To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;

1910.1200(i)(3)(ii)(C)

To conduct pre-assignment or periodic medical surveillance of exposed employees;

1910.1200(i)(3)(ii)(D)

To provide medical treatment to exposed employees;

..1910.1200(i)(3)(ii)(E)

1910.1200(i)(3)(ii)(E)

To select or assess appropriate personal protective equipment for exposed employees;

1910.1200(i)(3)(ii)(F)

To design or assess engineering controls or other protective measures for exposed employees; and,

1910.1200(i)(3)(ii)(G)

To conduct studies to determine the health effects of exposure.

1910.1200(i)(3)(iii)

The request explains in detail why the disclosure of the specific chemical identity is essential and that, in lieu thereof, the disclosure of the following information to the health professional, employee, or designated representative, would not satisfy the purposes described in paragraph (i)(3)(ii) of this section:

1910.1200(i)(3)(iii)(A)

The properties and effects of the chemical;

1910.1200(i)(3)(iii)(B)

Measures for controlling workers' exposure to the chemical;

1910.1200(i)(3)(iii)(C)

Methods of monitoring and analyzing worker exposure to the chemical; and,

1910.1200(i)(3)(iii)(D)

Methods of diagnosing and treating harmful exposures to the chemical;

1910.1200(i)(3)(iv)

The request includes a description of the procedures to be used to maintain the confidentiality of the disclosed information; and,

..1910.1200(i)(3)(v)

1910.1200(i)(3)(v)

The health professional, and the employer or contractor of the services of the health professional (i.e. downstream employer, labor organization, or individual employee), employee, or designated representative, agree in a written confidentiality agreement that the health professional, employee, or designated representative, will not use the trade secret information for any purpose other than the health need(s) asserted and agree not to release the information under any circumstances other than to OSHA, as provided in paragraph (i)(6) of this section, except as authorized by the terms of the agreement or by the chemical manufacturer, importer, or employer.

1910.1200(i)(4)

The confidentiality agreement authorized by paragraph (i)(3)(iv) of this section:

1910.1200(i)(4)(i)

May restrict the use of the information to the health purposes indicated in the written statement of need;

1910.1200(i)(4)(ii)

May provide for appropriate legal remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages; and,

1910.1200(i)(4)(iii)

May not include requirements for the posting of a penalty bond.

1910.1200(i)(5)

Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

1910.1200(i)(6)

If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.

..1910.1200(i)(7)

1910.1200(i)(7)

If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity, the denial must:

1910.1200(i)(7)(i)

Be provided to the health professional, employee, or designated representative, within thirty days of the request;

1910.1200(i)(7)(ii)

Be in writing;

1910.1200(i)(7)(iii)

Include evidence to support the claim that the specific chemical identity is a trade secret;

1910.1200(i)(7)(iv)

State the specific reasons why the request is being denied; and,

1910.1200(i)(7)(v)

Explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.

1910.1200(i)(8)

The health professional, employee, or designated representative whose request for information is denied under paragraph (i)(3) of this section may refer the request and the written denial of the request to OSHA for consideration.

1910.1200(i)(9)

When a health professional, employee, or designated representative refers the denial to OSHA under paragraph (i)(8) of this section, OSHA shall consider the evidence to determine if:

..1910.1200(i)(9)(i)

1910.1200(i)(9)(i)

The chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret;

1910.1200(i)(9)(ii)

The health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information; and,

1910.1200(i)(9)(iii)

The health professional, employee or designated representative has demonstrated adequate means to protect the confidentiality.

1910.1200(i)(10)

1910.1200(i)(10)(i)

If OSHA determines that the specific chemical identity requested under paragraph (i)(3) of this section is not a "bona fide" trade secret, or that it is a trade secret, but the requesting health professional, employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality

agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA.

..1910.1200(i)(10)(ii)

1910.1200(i)(10)(ii)

If a chemical manufacturer, importer, or employer demonstrates to OSHA that the execution of a confidentiality agreement would not provide sufficient protection against the potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations or conditions upon the disclosure of the requested chemical information as may be appropriate to assure that the occupational health services are provided without an undue risk of harm to the chemical manufacturer, importer, or employer.

1910.1200(i)(11)

If a citation for a failure to release specific chemical identity information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act's enforcement scheme and the applicable Commission rules of procedure. In accordance with the Commission rules, when a chemical manufacturer, importer, or employer continues to withhold the information during the contest, the Administrative Law Judge may review the citation and supporting documentation "in camera" or issue appropriate orders to protect the confidentiality of such matters.

1910.1200(i)(12)

Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

1910.1200(i)(13)

Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

..1910.1200(j)

1910.1200(j)

"Effective dates." Chemical manufacturers, importers, distributors, and employers shall be in compliance with all provisions of this section by March 11, 1994.

Note: The effective date of the clarification that the exemption of wood and wood products from the Hazard Communication standard in paragraph (b)(6)(iv) only applies to wood and wood products including lumber which will not be processed, where the manufacturer or importer can establish that the only hazard they pose to employees is the potential for flammability or combustibility, and that the exemption does not apply to wood or wood products which have been treated with a hazardous chemical covered by this standard, and

wood which may be subsequently sawed or cut generating dust has been stayed from March 11, 1994 to August 11, 1994.

[59 FR 17479, April 13, 1994; 59 FR 65947, Dec. 22, 1994; 61 FR 5507, Feb. 13, 1996]

Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210